BOMBAY GOVERNMENT RECORDS.

No. LXIII.—New Series.

ANNUAL PROGRESS REPORTS

OF THE

EXECUTIVE ENGINEERS

IN THE

SOUTHERN, CENTRAL AND NORTHERN PROVINCES, ALSO SIND FOR 1858-59.

WITH MAPS, PLANS, &c.

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EXECUTIVE ENGINEERS IN THE SOUTHERN, CENTRAL, AND NORTHERN PROVINCES

OF THE

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BOMBAY PRESIDENCY,

FOR [illegible]AR 1858-59;

ND IN

[illegible]E SIND PROVINCE

FOR THE YEAR 1858-59.

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WITH MAPS, PLANS, &c.

Bombay:
PRINTED FOR GOVERNMENT
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1861.

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No. 7945 of 1859.

General.
Accounts.

Public Works Department,

Office of Chief Engineer at the Presidency,
Bombay, 7th December 1859.

To the Right Hon'ble Lord Elphinstone, G.C.B., & G.C.H.,
Governor, and President in Council.

My Lord,—In compliance with the instructions in the Government Resolution under Mr. Secretary Hart's memorandum, No. 1806, of the 27th November 1855, I have the honour to submit the Annual Reports of the several Executive Engineers under my control, of their operations during the year 1858-59, together with Sketch Maps of the several districts, and the transmitting memoranda of the Superintending Engineers.

2. It does not seem to me necessary to notice all the suggestions which have been made by the Executive or the Superintending Engineers, which are, in many instances, foreign to the purpose of these reports. I propose to notice only such observations as apply to the progress of the principal works and the administration of the Department generally during the year.

Dharwar.

3. The construction of the military roads, connecting the Dharwar districts with the Goa and Canara frontiers, has proceeded satisfactorily. The sum expended (Rs. 300 a mile) has been well laid out, but it does not include the cost of the material used in the timber cross-drains, which has been cut from the Government jungles, and for which a bill will be preferred by the Conservator's Department. Temporary bridges across the principal streams on these lines do not seem to be urgently required. The streams present no obstacle to traffic, except for a short time during the monsoon. Captain Playfair's proposal for their immediate construction has not therefore been brought forward.

4. Captain Playfair satisfactorily explains the bad state of repair of the Hooblee and Yellapoor road, which has so frequently been the cause of complaint by the cotton merchants. Until the road be raised and provided with a moorummed or metalled surface, its condition must always be very bad at the commencement of the dry season—the time when there is the greatest traffic. On the relaxation of the present restrictions on public works expenditure, the improvement of this line will claim the first attention.

Belgaum and Kolapoor.

5. I concur in the remarks made by the Acting Superintending Engineer on the unsatisfactory condition of the temporary barracks at Belgaum. With better management on the part of the Executive Engineer, they might have been made to afford more efficient shelter.

6. The office establishments of the Executive Engineers in this Presidency having been but recently fixed by the Government of India, the proposal that the establishment of the Executive Engineer, Belgaum and Kolapoor, should be specially increased, cannot be entertained. The Executive Engineer has a 1st class office establishment; and for the works at Kolapoor and Kulladghee, the Assistants in charge might be granted, if found necessary, the office establishments of Special Assistant Engineers.

7. The steam saw-mill which Captain Dickinson desires for the use of his Department would, as the Acting Superintending Engineer remarks, be of no permanent local use, and the expense of procuring it from England would not be warranted. In the event of a general depôt for public works plant being established, such a machine might be found of great use, unless, as is probably the case, the use of timber in the construction of barracks be generally superseded by the use of wrought-iron frame-work.

8. The proposition in page 66 of the report, and in paragraph 12 of the Acting Superintending Engineer's memorandum, to fix the pay of labourers, cannot, of course, be entertained.

9. The charge of road-side trees has since been transferred to the Collectors.

10. I do not understand the statement in the concluding paragraph of Captain Dickinson's report, that he is in the position of a security to his Head Accountant. The Accountant has no money responsibility,

but is responsible solely to the Executive Engineer for the correct keeping and compilation of the accounts.

Southern Concan.

11. The late Mr. Armitstead's report seems to require no remark. He was succeeded as Executive Engineer, Southern Concan, by Lieutenant Holland on the 4th May 1859.

Sattara.

12. I have nothing to add to Major North's remarks on Captain Kennedy's satisfactory report of the proceedings of his department, except that, while fully concurring in the necessity for improving the road between Sattara and Kolapoor as early as practicable, the immediate commencement of the work, as recommended by Major North, seems out of the question.

Sholapoor.

13. The principal work executed in this district has been the Sholapoor and Hydrabad road, as far as Tandoolwarri, which has been opened out to traffic and completed, with the exception of portion of the curbing.

14. The failure of certain tanks in this collectorate was noticed in my last Annual Report.

15. So soon as subordinates are available, I propose to place at the disposal of the Executive Engineer a few Sub-Overseers for employment as Muramut Maistries, as recommended by Major North.

Poona District.

16. The principal work in this district has been the repairs to roads. It may be eventually found necessary to metal the whole of the Poona and Nassick road; but to metal the Poona and Sholapoor road as far as the Bheema, as recommended by the late Executive Engineer, Lieutenant Colonel Graham, seems quite unnecessary, as the road, if not already so, will shortly be superseded by the Railway.

Poona and Kirkee Cantonments.

17. I have nothing to add to the Superintending Engineer's remarks on Captain Boddam's report. The frequent necessity for petty

repairs to military buildings would be much obviated, were Commanding Officers of Regiments enjoined to take measures for the avoidance of injuries to the fixtures and fastenings of barracks, by the wilfulness or carelessness of the men occupying them. The arrangement suggested at the conclusion of Lieutenant Colonel Munbee's letter is worthy of adoption, and I will take measures for its general introduction.

Northern Concan.

18. The Executive Engineer's report, except in so far as it shows that the actual has, in many instances, exceeded the sanctioned expenditure (a fault on the part of the late Executive Engineer, Captain Fuller, which has been often brought to the notice of Government), appears satisfactory.

19. With regard to the deterioration of the water in the cistern below the Khurdee tank, by the decomposition of weeds, and in the Rurtoonda tank by the defilement of cattle, the Executive Engineer will be directed to adopt means for clearing the former, and the Collector of Tanna should, I think, be directed to adopt measures for preventing or checking, as much as possible, the washing of cattle in the latter reservoir of drinking water.

Ahmednuggur.

20. No remarks seem called for on this report. An Assistant will be placed at Captain Finch's disposal when available for, employment on the irrigation projects which he recommends.

Nassick.

21. The completion of the Chundunpooree Ghaut has been sanctioned since the date of the report. No further remark seems to be called for.

Candeish.

22. The principal works carried on in this district are enumerated at the commencement of the Executive Engineer's report, the largest and most costly being the temporary barracks for European Artillery at Malligaum; temporary pendalls on the Agra road for troops travelling by transport train; and the improvement of the Agra road north of the Taptee.

23. I have nothing to add to the remarks of the Superintending Engineer, Central Circle.

Bombay and Agra Road, Mhow Division.

24. It is to be regretted that, owing to the difficulty of obtaining labourers, the progress of the works under Captain Finch has been so unsatisfactory. Captain Finch is at liberty to raise his labour rates if the present are not sufficiently attractive; but I fear there are not people in sufficient numbers to be attracted. I think, however, that, if he be able to get people north of the Nurbudda, he might be able to induce them to accompany him to Scindwa, and to remain there. I have impressed on Captain Finch the necessity for using his best endeavours to obtain work-people, and retain their services when he has got them.

Mhow.

25. The works executed in this division have been chiefly buildings required for the accommodation of troops. With respect to the mention made in paragraph 21 of the upper-storied barrack for two companies of Europeans at Indore, it has since been discovered that there had been great mismanagement, and fraudulent transactions to a considerable extent on the part of the subordinates employed in their construction. The two persons favourably noticed in paragraph 21, viz:—Alla Bux, maistry, and Dajee Abajee, overseer, are shortly to be tried for conspiracy and fraud; but the present Executive Engineer fears that the evidence against the latter will scarcely be sufficient to convict him, as the principal witness has absconded. Captain Melliss states that the barrack has cost Rs. 1,32,063 already, including the cost of timber sufficient to complete the building, but that it is only about two-sevenths finished. I am now awaiting information from Captain Melliss, as to what the barrack ought to have cost under proper management, according to the present rates of labour and materials, and what he now estimates as the probable total expenditure on the work; and I pointed out that a report of the probable cost should have been made when the work was first ordered. On receipt of this information, I shall make a full report on the subject.

26. The crippled condition of the late Executive Engineer, Captain Davidson's establishment for one half the year, is described in

paragraph 30, and the total inexperience of the only sub-overseers he could be supplied with, in the 32nd paragraph. I have taken measures to improve the efficiency of his establishment, and it is now on an adequate footing. Its inefficiency at first was the necessary result of the inadequacy of the subordinate establishment of the Public Works Department in this Presidency, to meet the sudden demand on it, caused by the transfer of the Mhow Division of Public Works.

Surat and Broach.

27. The only portion of this report requiring notice is that relating to the crumbling state of the Surat Castle walls. Should Ransom's patent process for silicifying stone be found to answer its promise, it might advantageously be applied to the prevention of the further disintegration of the Surat Castle walls, provided the cost of the materials to be used, on which we have as yet no information, do not prove an insuperable objection.

Ahmedabad and Deesa.

28. These reports suggest no particular remarks. The works in progress have mainly been for military purposes, as have been also, though on a larger scale, the works at Nusseerabad and Neemuch, the Executive Engineer of which stations has not submitted any report of his operations during the past year.

I have the honour to be,

My Lord,

Your Lordship's most obedient Servant,

Walter Scott, Colonel,

Chief Engineer at the Presidency.

No. 1715 OF 1859.

General.
Accounts.

PUBLIC WORKS DEPARTMENT,

Chief Engineer's Office, Camp Kurrachee, 14th July 1859.

Transmitting to the Chief Secretary to Government the documents as per margin, in original, with the following remarks by the Acting Chief Engineer in Sind :—

Submits Captain Merriman's Annual Report of Operations for 1858-59.

Annual Report (No. 749 of 1859) for the year 1858-59, by Captain Merriman, Executive Engineer of the Kurrachee Station and Port, and in temporary (but limited) charge of the Lower Sind District, of the Operations of his Department, with Sketch Map of his District, and Tracing of the Kurrachee Cantonment.

2. Second Captain Merriman, having held this acting appointment since the month of January 1858, was confirmed in it by G. O. of the 7th December following. There has been no change in this charge during the official year.

No change in the head of the Department during the year.

3. The want of an Executive Officer to take charge of the Lower Sind Division, even with the present restriction on public works, is much felt, as his time might be most usefully employed in preparing important projects, particularly the one in connection with the works necessary to improve the navigable channels of the Delta, the necessity for which has more than once been brought to my notice by the Commissioner. Until an officer is appointed, the whole of the military trunk roads also in this division cannot be taken over from the Collectors, in whose charge they must for the present remain.

The want of an officer for the executive charge of the Lower Sind Division.

4. Captain Merriman observes that the restriction placed on Public Works expenditure in August 1857 has prevented the progress of many useful works; and that much of his work, though not

Restriction on Public Works in August 1857.

worth recording, occupies a very considerable portion of an Executive Officer's time and attention. These remarks are particularly applicable to a charge like Captain Merriman's, involving so many petty works, and the requirements of a large camp and two naval stations.

Filth-burning Kiln.

5. The first work is the filth-burning kiln, which appears to answer better than the old ones. It is similar in design to those lately constructed at Poona—a copy of the plan of one having been obtained by the Acting Chief Engineer and furnished to Captain Merriman.

Well and Aqueduct for Plunge Bath near European barracks.

6. The next work is the well and aqueduct for supplying water to the plunge bath of the new European barracks, which, it is to be regretted, was not completed by the commencement of the hot season. The causes of delay in the prosecution of this work are explained; and it appears so far favourably progressing at present, that its completion may be soon expected.

Iron Barracks from England.

7. Of the iron barrack material received from England for the use of the Punjaub Government, several sections have been built at Kurrachee; one length of 204 feet is used as a barrack for the local Police, and appears to answer its purpose well, and was erected at a moderate cost. Other sections of various lengths have been put up, in lieu of those portions of the Arsenal destroyed by the explosion in September last, and to meet the increased space required for the storage of ammunition, &c. *en-route* to the Upper Provinces. One length only, of about 210 feet, now nearly completed, is intended for the accommodation of European troops, and this will be the first of the kind so occupied in Sind.

Powder Magazine in the middle of the Kurrachee Cantonment.

8. A field powder magazine was constructed in the compound of the large magazine shortly after the Arsenal explosion. The Acting Chief Engineer has more than once submitted his views on the subject of providing some more safe place of deposit for gunpowder than this magazine affords—close to the bazar, and in the middle of the cantonment.

Ghizree Dock.

9. The foundation to the mud dock at Ghizree, which was lately sanctioned, progresses but slowly, owing to the difficulty of keeping the water out, and the

great demand at present by all departments for labour, and difficulty of procuring work-people.

Tanks at Hands Hill.

10. The success reported of the Hands Hill Tank is very gratifying. Works of this sort in the vicinity of Kurrachee, the country for miles around which is a desert, and where drinking water is so scarce, must be a great benefit. There can be but little doubt that the Soughal tank, if it proves as successful a work, will be equally valuable.

Beacons at the mouths of the Indus.

11. The Beacons at the mouths of the Indus, and in other parts of the navigable creeks, are much required; some arrangement will probably be effected in a few days for constructing them.

Kurrachee Harbour.

12. The earthen Bund at Munora, to prevent the sea from finding its way into the Tullee creek, will require very careful watching during the present monsoon. A more secure protection against the encroachments of the sea on this side of the harbour will probably be found necessary, and, as Captain Merriman remarks, will, in all probability, engage the early attention of the officer appointed to the charge of the Harbour works.

Kurrachee Mole.

13. The widening of the Kurrachee Mole has been recently completed; but, owing to the line of rails lately laid down by the Railway Company on the widened-out portion, the improved work, for some time to come, will not be of much benefit to the public. What with the line of rails on one side, and quantities of merchandize at the upper portion of the Mole piled on the other, it is during the day-time seldom passable without delay, confusion, and difficulty. Pitching the slope on the eastern side is very nearly completed, and is, beyond all doubt, a very necessary work.

Communications. Unmetalled Roads.

14. The repairs to the cleared road between Kurrachee and Tatta, now, for the first time, executed by the Public Works Department, have lately been completed. The bad state of this road was brought to notice by the Commissioner in August last, and a sanction of Rs. 5,996 was obtained, and the repairs executed. It is 60 miles in length. The breadth of the present cleared track is excessive; and before any extensive improvements are made to it, a

careful survey of the line should be made. Even with the repairs recently executed, the present line is anything but a good road, and is susceptible of much improvement.

Current Repairs for 1858-59.

15. Under a misapprehension of the orders restricting expenditure on Public Works, the annual current repairs to roads and buildings, for 1858-59, were not sanctioned. The really bad and neglected state of the former, towards the close of the year, became so apparent, that an emergent sanction was obtained for their immediate repair. Previously, however, to this, and shortly after the Acting Chief Engineer arrived in Sind, regular Survey Reports and Estimates for the current repairs for 1859-60, of all public buildings and roads under the Public Works Department in the province, were called for, and, after due examination, sanctioned. The roads will doubtless improve if efficiently maintained; but if the repairs for one year even be neglected, especially in such a cantonment as Kurrachee, where the cart traffic is enormous, and is daily increasing, it takes two or three seasons to get them into good order again.

Estimates and Survey Reports of Current Repairs for 1859-60.

Qualifications of Assistants and Subordinates.

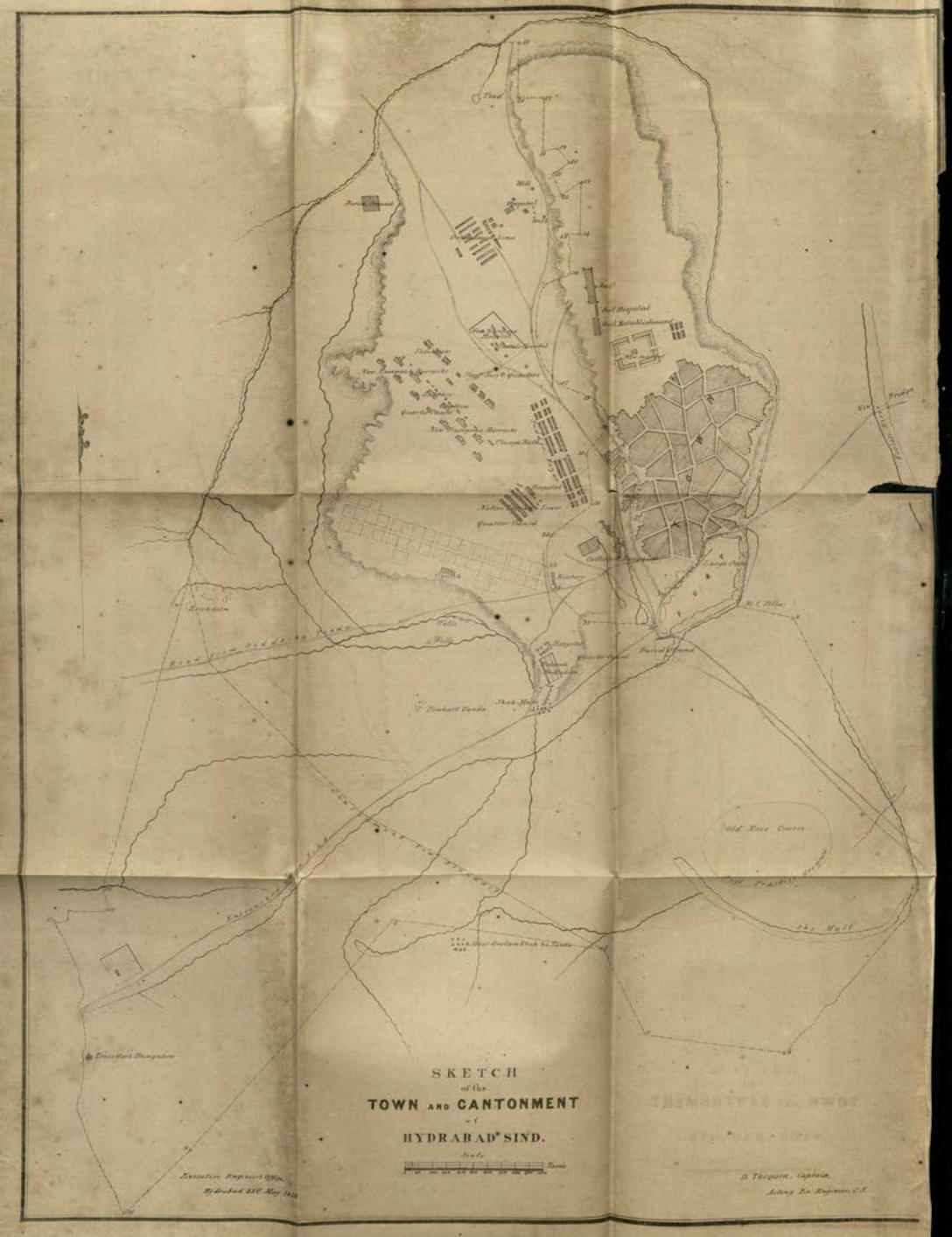
16. Captain Merriman speaks well of his assistants and subordinates, but considers the practice of making his office a kind of depôt for new arrivals and sick men from up-country a disadvantageous one. This is, no doubt, attended with some inconvenience; but at present there is no help for it, and the practice cannot be avoided. I have a very great objection to sending any new arrivals in the province to Central or Upper Sind during the hot season. When the system of a general and regular relief for Sind, as proposed by the Chief Engineer at the Presidency, is carried out, this practice will be discontinued.

Has sufficient Agency at his disposal for carrying on works.

17. This officer concludes his report by stating that he has sufficient agency at his disposal for carrying out the works entrusted to him for 1859-60.

Tracings accompanying Report.

18. The tracings accompanying are a marked improvement on those sent in for 1857-58. The map of his district, however, contains no reference to the district works, roads, telegraph lines, &c.



SKETCH
of the
TOWN AND CANTONMENT
of
HYDRABAD SIND.

SKETCH MAP
OF
HYDRYBAD COLLECTORATE.

Scale of 20 Miles to an Inch.

I. Thomson, Captain.
Ex. Engineer, Central Sind.

68° E.L. 69° E.L. 70° E.L. 71° E.L.

27° N.L.

26° N.L.

25° N.L.

REFERENCES.

Main Lines of Road coming under charge of Executive Engineer after 20th May 1850 ——— Miles

Hydrabad to Omercote distance ——— 16

Hydrabad to Kotree on the Nuggur Parkur direction ——— 134

Hydrabad to Nuggur Parkur distance ——— 203

D.C.E. Stands for Deputy Collector Engineer

Telegraph Lines finished ——— — — —

That from Hydrabad to Nuggur Parkur as part of Line from Bhurrachee to Bombay

That from Hydrabad to Kotree as part of Line from Kurrachee to Kurrachee and the Sutlej

Boundary of Collectorate

Main Roads under Executive Engineer ———

Exec. Engineer's Office
Hydrabad 22d May 1850

Jerruck, Dandu, Tullo, Mourpur Buttoro, Thurro, Jhurjoree, Sooraree, Khanlooro, Shurka Bundur, Kak, Kotree, Tuckpalo, Doomb, Tanoorie Kotree, Sumbooya Bundur, Tarrooka, Mirrah, Tullur, Bundeh, Sehwan, Kazee ka Goth, Bulla, Dadhabund, Kyndabund, Tullur Dehrah, Hydrabad, Mullore, Tullore, Kotree, Meerpoor, Omercote, Nuggur Parkur, Dhurro, Nowsheh, Wanga Bazar, Dhuplo, Pelligaro, Burma Bagar, Tarsawa, Nuggur Parkur, Gudder, Kunker, Chachro, Dugar, Nowsheh, Wanga Bazar, Tarsawa, Nuggur Parkur, To Bhuj.

Nothing of general professional interest to communicate.

19. Captain Merriman reports in a separate letter, that he has nothing of general professional interest to communicate.

P. L. HART, Captain,
Acting Chief Engineer, Sind.

No. 1716 OF 1859.

PUBLIC WORKS DEPARTMENT,

Chief Engineer's Office, Camp Kurrachee, 14th July 1859.

Transmitting to the Chief Secretary to Government the documents as per margin, in original, with the following remarks by the Acting Chief Engineer in Sind :—

Submits Captain Thomson's Report for 1858-59.

General.

Annual Report (No. 377 of 1859) for the year 1858-59. By Captain Thomson, Executive Engineer of Central Sind, of the Operations of his Department, with a Sketch Map of his District, and Tracing of the Hydrabad Cantonment.

2. Captain Thomson held the acting appointment from January 1858, to the date of his being confirmed in it by the G. O. of the 7th December 1858 ; there has consequently been no change in this division during the past official year.

No change in the head of the Department during the year.

3. The Naval station of Kotree, which now forms a part of this officer's charge, will, on the appointment of an officer to Lower Sind, belong to that division.

Kotree will be hereafter part of the Lower Sind charge.

4. Captain Thomson has divided his Report under the following heads :—

Sub-division of his Report.

1*st.*—A tabulated Statement of all works carried out or in progress, showing the expenditure for the year on each, distinguishing works of importance from those of a minor nature, including petty works.

2*nd.*—Observations on the works most worthy of notice.

3*rd.*—Establishment and Agency.

4*th.*—General remarks on the year's work.

5*th.*—A list of the sanctioned works suspended.

The first of these is, I think, a useful record.

5. The large Arsenal in the Fort of Hydrabad is now nearly completed, and the Powder Magazine, which has been so greatly delayed by alterations in the design, is reported to be proceeding briskly.

Military Ordnance.

6. The resumption of the work on the Masonry Bridge across the Foollailee, on the Hydrabad and Meerpoor road, was ordered by the Commissioner in January last; and when the Acting Chief Engineer saw the work in February, the masonry of the piers was just commenced. Captain Thomson, however, has expedited the work, and reports that he has arranged for continuing the arching during the inundation, and hopes soon to be enabled to report the work completed.

Communications. Bridges.

6. A. Two Wooden Bridges across the new Foollailee cut have been commenced: one, a temporary structure, on the Hydrabad Camp and Meeanee road (a permanent masonry design for which has been submitted), which has been erected; the other a wooden bridge, of squared timber and masonry, on the Hydrabad town and Meeanee road, now in course of construction.

Communications. Bridges.

7. The protection of the river bank above Kotree, the immediate necessity for which only became apparent late in the season, when I inspected it on my return from the frontier, down the left bank of the river, is now being temporarily provided for, by covering the parts liable to erosion, with a coarse description of date mat, pegged down to the banks. An earthen Groyne, roughly pitched with stone, was also constructed some distance up the river from Kotree. The effect of this latter will be seen in a few months, when some more permanent means must be devised for the protection of this bank of the river.

Communications. River Improvements.

8. Little progress has as yet been made towards the completion of the Church, owing to the great demand for labour on the other works in progress, and by the Railway Department.

Ecclesiastical. Churches.

9. The completion of the Meeanee monument has proceeded in a very dilatory manner. Satisfactory arrangements have been made for the preservation of the enclosure in a proper manner.

General. Monuments.

10. With respect to Captain Thomson's remarks on Municipal works at paragraph 15, it is incorrect to state that I disapproved of such being executed by him. I disapproved of his having the entire control of the funds and details of these works; and in letter No. 2478 of 1858, dated 6th November, I submitted my views on this subject to Government.

Municipal Works.

11. Under the head of Office Establishment and Agency, Captain Thomson speaks in high terms of his Head Clerk and Accountant, 2nd Clerk, and Storekeeper,—particularly of the former, Mr. Griffs. With the abilities of his subordinates, employed in the superintendence of works, he does not appear to be so well satisfied. It is as well to notice that no complaint, until lately, when Serjeant Overseer Crane was ordered to be removed to Kurrachee, has been made to the Acting Chief Engineer. Serjeant Crane had been upwards of 2½ years at Hydrabad; and during a great portion of that period, he is reported to have been a great sufferer from fever. The native overseers are all young men, who will improve as they gain experience. Adja Mull, Maistry, on the permanent establishment, is spoken of in the highest terms, and most deservedly so. This man's appointment to the lower subordinate establishment on an increased salary, was recommended to Government in letter No. 2198 of 1858, dated 4th October.

General Establishments.

12. Captain Thomson, in his general remarks on the year's work, notes—

General Remarks on the year's work.

1*st.*—Present unsatisfactory state of the labour market, &c.

2*nd.*—The advantages possessed by other Public Departments in having no Estimates or sanctions to work upon, &c.

3*rd.*—His want of power to entertain, to reward, and punish, &c.

4*th.*—Suggests the increase of his permanent Establishment, &c.

5*th.*—Remarks on the new contract system, &c.

6*th.*—Feels great hesitation in making these suggestions, &c.

7*th.*—Remarks upon the insufficiency of his Establishment for the year, and the number of petty works, &c.

With respect to the first, there is a good deal of truth in his remarks. There is at present very great demand for labour of all sorts, and Captain Thomson, with others, experiences a difficulty in procuring the full quantity which he wants. No remedy can be devised for this difficulty—no

Scarcity of Labour.

law can touch it. Captain Thomson cannot be supposed to wish the price of labour fixed by a positive edict. The remuneration of work-people must depend upon the call for their exertions, and upon the supply of labour where the demand makes itself felt. With respect to the appplication for Magisterial powers, a demi-official was submitted to the Commissioner on the subject, and these powers were not granted, because it was considered inexpedient to do so. The work performed by the other departments alluded to by Captain Thomson, that is, by the Ordnance, Commissariat, and Naval, appears to me to be of a nature not easily to admit of estimates, a great portion of the miscellaneous work being performed by contract, agreeably to a schedule of rates. Adverting to his want of power to reward and punish, provision is made, to a certain extent, for this at page 18 of the Public Works Code. The permanent establishment of the Central Sind Office is as per margin; and in February last, in consideration of the repairs to the Trunk roads falling to his charge, an application was made to Government, in order that Captain Thomson, with the other Executive Officers, might each be provided with a Special Assistant (*see* Acting Chief Engineer's letter, No. 430 of 1859, dated 16th February). Captain Thomson's remarks on the want of contractors is correct; but the formation of such a class not unfrequently depends on the Executive Officer himself. His establishment is composed of comparatively new hands; in fact, no experienced subordinates appear at present ever to be sent to the province: all that have arrived within the last year, have been young men, fresh from the Engineering School, and consequently what Captain Thomson states of their inefficiency, or rather want of experience, is correct. It is a great pity, I think, that, in the reliefs, some of the older subordinates are not sent.

Magisterial Powers.

1 Serjeant Assistant Overseer.
4 Native Assistant Overseers.
1 Sub-Overseer, 3rd Class.
1 Maistry Carpenter.

New Contract system.

Want of experienced Subordinates in Sind.

13. From among the list of suspended and projected works, Captain Thomson especially notices his project for supplying water to the camp and city of Hydrabad, by the improvement of the town tanks, and the construction of a large tank near the Belooch lines, the

Projected Works, and Works under suspension.

supply being drawn from the Foollailee. This project originated in certain recommendations by the then Superintending Surgeon in Sind, Dr. Collier, for improving the sanitary condition of that camp. The report has been divided into two heads—Civil and Military; and the plans and estimates of the project, proposed by Captain Thomson, were handed up by the Acting Chief Engineer in November last, for the opinion of the Officer Commanding the Division; but no reply has as yet been received.

Water supply, Hydrabad Contonment.

14. In alluding to the Sketch Map which accompanies his Report, Captain Thomson invites attention to the immense distance at which Nuggur Parkur is situated from his head quarters, and suggests that the works there may, for the future, be undertaken by the Executive Engineer, Deesa. As regards this suggestion, it may be remarked that, up to the present time, there have been no works at Nuggur Parkur. The one now in progress, the bungalow for the Signallers of the Electric Telegraph Department, is being constructed by the Executive Engineer of Deesa, with whom, and without the Acting Chief Engineer's permission, Captain Thomson entered into an arrangement to get the work done.

Distance of Nuggur Parkur from his Head Quarters at Hydrabad.

15. With respect to the rapid manner in which the line of Telegraph posts was set up on the road from Hydrabad to Ali Morad's Kotree, a distance of about 150 miles, which was commenced on the 31st August and completed on the 15th September, Government, in their Resolution No. 2621 of 1858, dated the 22nd October, desired that their satisfaction at so favourable a report be communicated to Lieutenant Thomson by the Commissioner in Sind.

Electric Telegraph.

16. Captain Thomson reports that nothing of extraordinary interest has occurred during the year,—no great failures, and no great successes.

Works of Professional interest.

P. L. Hart, Captain,
Acting Chief Engineer in Sind.

No. 1717 OF 1859.

PUBLIC WORKS DEPARTMENT,

Chief Engineer's Office, Camp Kurrachee, 14th July 1859.

Transmitting to the Chief Secretary to Government the documents in original as per margin, with the following remarks by the Acting Chief Engineer in Sind :—

Submits Lieutenant Pym's Annual Report.

Annual Report (No. 375 of 1859) for the year 1858-59, by Lieutenant Pym, Executive Engineer of Upper Sind, of the operations of his Department, with a Sketch Map of his District, and Tracing of the Camp and Town of Jacobabad.

No change in the Office worth noticing during the past official year.

2. Lieutenant Pym relieved Mr. Mossop of the acting charge in July 1858, and was confirmed in the appointment by G. O. of the 7th December following.

New Lines for the 3rd Regiment Sind Irregular Horse at Jacobabad.

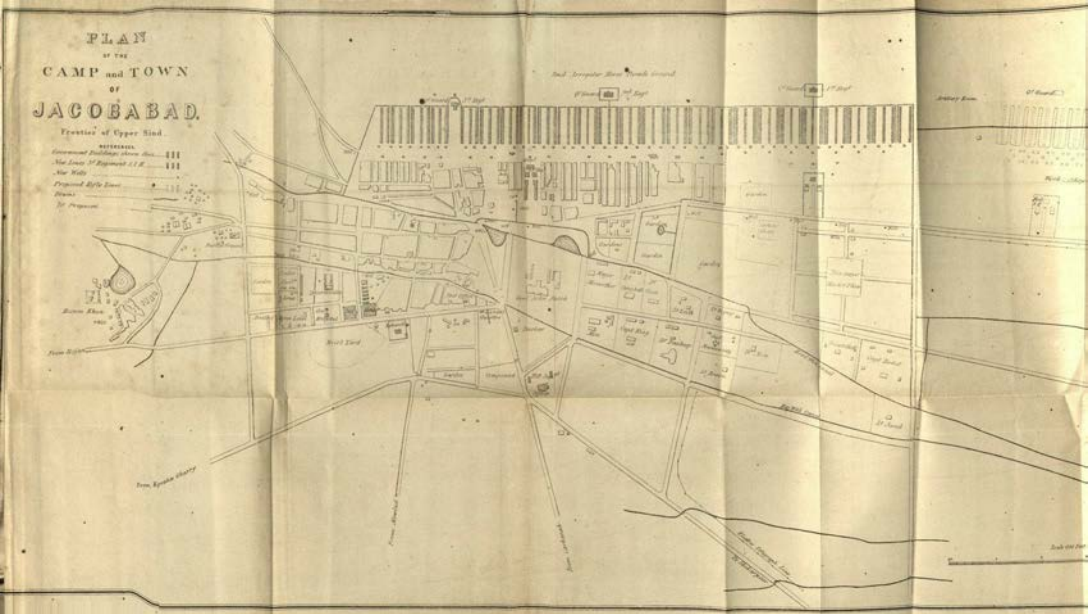
3. Lieutenant Pym, in reporting the satisfactory completion of the new lines at Jacobabad, for the 3rd Regiment of Sind Irregular Horse, notices the marked improvement in the work over any of the same description previously executed at Jacobabad; the Acting Chief Engineer having visited and inspected the buildings when on his tour, can, with pleasure, confirm this, and considers that great credit is due to Lieutenant Pym, and Mr. Radenhurst, who is the Resident Superintendent of the works at Jacobabad, for it.

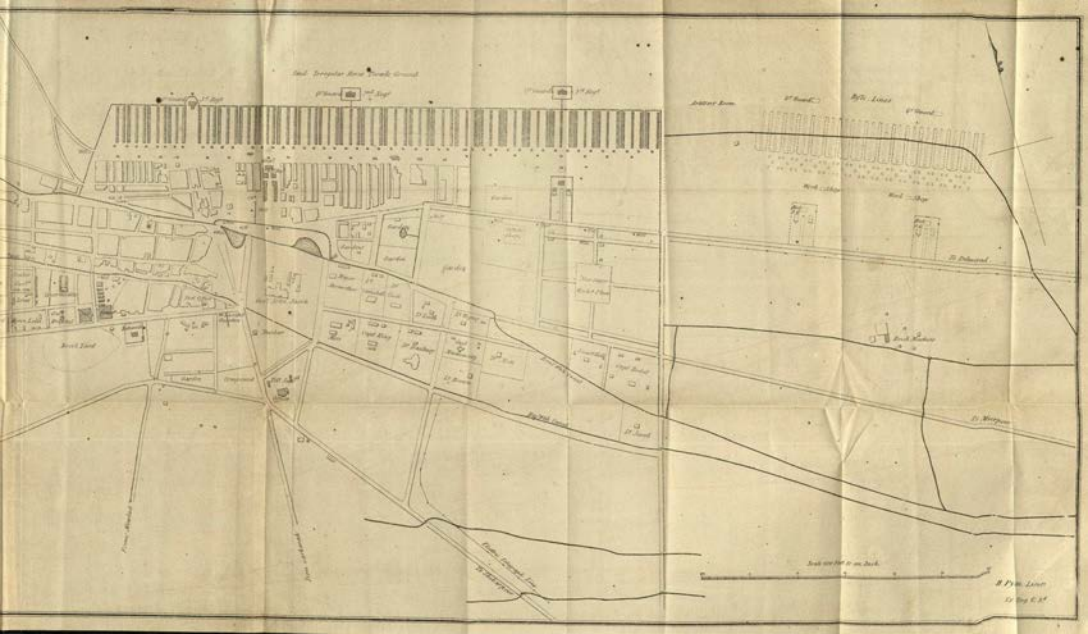
Platforms of Wells at Jacobabad.

4. Lieutenant Pym's proposals for remedying the sinking of the platforms around the wells at Jacobabad have been received. In the Acting Chief Engineer's opinion, these propositions do not strike at the root of the evil, but as Lieutenant Pym has had some experience in remedying the defect, his proposals were recommended for adoption to Government.

Plunge Bath at Shikarpoor.

5. The Plunge Bath at Shikarpoor has been completed some time, though not until the greater part of the hot season of 1858 had passsed. There are now no European troops at Shikarpoor to make use of it,


PLAN
OF THE
CAMP and TOWN
OF
JACOBABAD.
Frontier of Upper Sind.
REFERENCES.
Government Buildings shown thus
Mar Lines 3d Regiment N.I.
Mar Walls
Proposed Rifle Lines
Streets
3d Regiment
Bazar Khan
Well
From Kojuk
From Kojuk Shahr
Road to Sukkur
Road to Shikarpur
Road to Dadur
Road to Kojuk



JAGIRABAD
Morpoor
BIGGAREE CANAL
SHIKARPOOR
INDUS
LARKANA
Sehwan
Jacobabad
Kumb Kote
Kotla
Sukkur
Rohri
Khairpur
Nawabshah
Hyderabad
Tando Adam
Mirpur Khas
Umerkot
Nagar Parkar
Thatta
Badin
Tando Muhammad Khan
Tando Allahyar
Matiari
Kotri
Jerruck
Kohistan
Sonmiani
Bela
Khozdar
Kalat
Quetta
Shikarpoor
Jacobabad
Larkana
Sehwan
Sukkur
Rohri
Khairpur
Nawabshah
Hyderabad
Tando Adam
Mirpur Khas
Umerkot
Nagar Parkar
Thatta
Badin
Tando Muhammad Khan
Tando Allahyar
Matiari
Kotri
Jerruck
Kohistan
Sonmiani
Bela
Khozdar
Kalat
Quetta
EASTERN NARA
WESTERN NARA
MEER WAH
SKETCH MAP
of
SHIKARPOOR COLLECTORATE.
Scale of 8 Miles to an Inch.
Exec. Engineer's Office
Shikarpoor May 1st 1849
Signed H. Pym, Lieutenant
Exec. Engineer U. Sind.
REFERENCES.
Roads under the charge of the
Exec. Engineer U. Sind
from the 1st May 1849
Travellers Bungalows
Telegraph Line

6. The substitution of arching for beams in the roofs of public buildings in Upper Sind, where timber is so constantly exposed to the ravages of white-ants, is very desirable, and is being gradually adopted.

Timber Beams to be dispensed with for Arches.

7. It is to be regretted that the Brick Machine has proved rather a failure.

Brick Machine.

8. Of his subordinates, Lieutenant Pym speaks in high terms. With respect to Mr. Radenhurst, whose duties are those of an Assistant, being in sole charge of the works at Jacobabad, and the numerous and distant out-posts along the Frontier, his name has been submitted for promotion to 1st Class Sub-Engineer, and Government were pleased to reply, that his claim should be considered on a vacancy occurring.

Establishments.

Mr. Radenhurst's promotion.

9. For the zeal and energy displayed by Lieutenant Pym in setting up the line of Telegraph posts through his district, viz. from Kotree, on Ali Morad's Frontier *viâ* Roree, across the river to Sukkur, and thence to Shikarpoor, Jacobabad, and along the Frontier road to Kusmore and Shawalla, a distance of about two hundred miles, Government were pleased to concur with the Commissioner in Sind, in regarding the completion of the line as highly creditable to that officer. The masonry towers, for carrying the Wire across the Indus at Sukkur, so as to connect the two banks of the river, are reported as progressing very favorably.

Electric Telegraph.

Masonry Towers for carrying Wire across the Indus.

10. The repairs made to the Sukkur and Shikarpoor road, though improving it much, are not of a sufficiently permanent character. An estimate has been called for, for executing the repairs with vitrified brick.

Repairs to Sukkur and Shikarpoor Road.

11. Lieutenant Pym in a separate communication states, that he has nothing of general professional interest to communicate.

Works of professional interest.

P. L. HART, Captain,
Acting Chief Engineer in Sind.

Extract of a Report by Captain Playfair, Executive Engineer, Dharwar, of his Operations during the year 1858-59.

2. Owing to the restriction on Public Works, consequent on the Mutinies, no new works of any importance (save perhaps the 2nd Class Military road to the Tinai Ghât) have been undertaken; but considerable sums have been expended on tank repairs and restorations, and the usual current work in keeping up existing buildings, roads, &c., has been properly attended to.

3. I think it as well to classify this Report under the same heads, and in the same order, as that of last year, viz.:—

Maramut Maistries.
Assistants and Subordinates (not including Maramut Maistries).
Additional subordinate assistance required.
Roads.
Proposed Roads.
Bridges.
Water supply to Hooblee.
Tanks, Works of Irrigation, &c.
Military.
Cutcherry Defences.

Maramut Maistries.

4. To each of the (8) eight talookas of the Dharwar Collectorate, a Maistry (or as nearly as the word can be explained in English, a Master Bricklayer or Carpenter, as the case may be) is appointed, who, under the supervision and control of the Executive Engineer, executes all petty works that may be ordered to be done from time to time; his permanent residence is in the talooka to which he may be appointed; he becomes acquainted with its resources in labour and materials, and is in a position to execute, without delay, any ordinary work, such as road and tank repairs, small district buildings, and clearances, &c., while any special works requiring higher skill, such as important new roads, bridges, &c., are entrusted to the more skilled subordinates of the department, who, being relieved by these Maistries of the comparatively insignificant though troublesome works, can give undivided attention to their proper duties. The pay of these Maistries is small in comparison to that of the skilled

subordinates, while they can execute the works allotted to them quite as well. I have already in various reports written very fully on this subject, and I will avoid needless repetition here, and simply refer to my last Annual Report, and what may be considered a supplement to it,—my letter to the Assistant to the Chief Engineer of Public Works, No. 806, of the 27th December 1858.

I may add, however, that, from the further experience of this year, the system continues to work well. I have had to find fault, but have nothing very serious to report concerning any of this class generally; the ryots and the civil subordinates spoke well of them, and that there is real confidence in them, is shown by the villagers, in many cases, (when, owing to the restriction on Public Works, the Government grant-in-aid has not been available), requesting that their own subscriptions might be expended, without waiting for the Government grant, and entrusting such subscriptions without scruple to the Maistry. I am also often requested to allow the Maistry to dig a well, or make a small tank, or such like work, entirely at the expense of some ryot who has money to spare; this would not be done were the men supposed to be dishonest, or did they (as is often the case with natives entrusted with power) bully and make themselves enemies. I have stedfastly endeavoured to establish this confidence, and on the whole am pleased with the result. Some trouble is caused by the "Punch" or Village Committee (whom I invariably appoint to audit the accounts and look after the expenditure) being exacting, and with the threat of not signing his papers, or reporting him trying to screw more work out of the Maistry than the estimate can possibly admit; but I have found the said Committee so useful as a check on expenditure, that I rather take their side than that of the Maistries, and in the end things are generally settled satisfactorily to all parties. The Raneebednore Maistry, though an excellent workman, has little power of organisation; he cannot make proper arrangements for a great number of works going on at once, and is not quick at his accounts. I found him too much in the hands of his Carcoon, whom I immediately transferred to another district. As I have said, however, I have no special complaint to make; the men know that I shall turn them away if they are not fit for their work, and should at any time such a necessity arise, I will make a timely report of it.

14. There does not seem to be any occasion to carry on the report

of qualifications to the clerks and others. I will merely say that the Head Clerk (or Accountant, as he is now styled,) Herbajee Sookdeo, has been recently promoted to first class, and that I think he well deserves it.

16. *Roads.*—Owing to the rebellion in North Canara, and the difficulty of marching troops from Dharwar or Belgaum to the disturbed districts, it was determined to open out a series of roads, two of which, viz., Lingunmutt to the Tinai Ghaut, and Goonjee to Juglepeit, were entrusted to Dr. Forbes, who was to be nominally attached for the purpose to the Dharwar division of the Public Works Department. A road had already been made from Dharwar to Lingunmutt, and Dr. Forbes has now nearly finished his portion on as far as "Hunmoad" (see Map) at the foot of the Tinai Ghaut. I hope this road will be finished this year; but great difficulty has been found in procuring labour, and as a small party of the rebels are still at large burning and pillaging in North Canara, it adds to the difficulty. I have assisted Dr. Forbes to the utmost of my power, and we have pulled together very cordially. In the early part of his work, he made road drains with frames of timber somewhat complicated and expensive. I suggested that he should use a pile-engine, and gave him one that I had made up. With his usual mechanical genius, he improved upon it, principally in the arrangements for lifting the ram and moving the pile-engine from one position to another. It answered admirably, and we were in the full career of bridging all the nullahs in our way, when it was destroyed by fire—supposed to be by the act of some incendiary, but the perpetrator has not been discovered.

All the drains hitherto made have been done out of the sanctioned sum of three hundred (300) a mile; but there are two large rivers, the 'Ayly' and 'Turwar,' which require a separate sanction. To throw perfect masonry bridges across them would necessitate an expenditure of at least Rs. 50,000; but I proposed and sent in plans of rough ones which I thought would answer—at first, at any rate, to cost about Rs. 9,000. These plans, however, have been returned to me, but I would again urge the construction of temporary bridges, at a moderate cost, over these rivers, to be replaced by more permanent structures if hereafter traffic seeks the line and warrants such increased expenditure. With these rivers unbridged in some way,

even military communication, for which the road was made, will be impeded, and I fear the substitute suggested of basket-boats will be hazardous, as these rivers have a great slope, and in flood must have currents of great rapidity. The Commission just returned from Goa and Sedashewgur, have recommended that the Tinaï Ghaut should be made practicable for carts, so as to facilitate the trade with Goa. Should this proposition be acceded to, it will be the more necessary to have these rivers bridged.

19. *Tanks, Works of Irrigation, &c.*—A great number of tank repairs have been executed, but few require special mention.

Two of the largest are at Assoondie and Gootul, in the Raneebednore talooka; both works will be finished this year. The bed of the former is so much silted up, that it will not hold much water. The villagers are most anxious to have the waste weir raised. I have told them that it would be folly to do this the first year, before the new work had consolidated ôr been tried by floods, but promised them that if all went well, I would raise it a little next year; and to do this safely, I have instructed the Maistry to endeavour to carry the stone-facing of the bund a little beyond the estimated height.

The Dhers, or low castes, are often prevented by the rest of the villagers from drinking or filling their water-vessels at the common tanks. When they have complained to me, as in the case of a reservoir at Dhoonchee, I have brought the subject to the knowledge of the Civil authorities; but in other cases that have come to my knowledge, such as at Hebsoor, where I built a small set of steps purposely for them, which they were not allowed to use, on inquiry being made, they professed themselves satisfied with existing arrangements, or were bullied into saying so by the higher castes. It seems to me that the water should be common to all, and that no assistance whatever, from funds over which the Government exercise any sort of control, such as those raised for municipal purposes, should be granted for drinking-water tanks or reservoirs, unless it were first distinctly settled, that the water was to be free to all—Brahmin or Dher.

20. A project has long been mooted for obtaining water from an old ruined tank in the Kode talooka, known as the Maduk tank. The experimental opening of the old sluices having been sanctioned, the work was done during the past season with great difficulty, and a report

made thereon. The obtaining water for irrigation from this tank is no doubt a matter of great difficulty. I had thought that the project I finally matured and sent in was the best under the circumstances, but as doubts are still expressed, I will place it on one side, until the Superintending Engineer can see and decide for himself.

23. *Military.*—The temporary Pendalls, finished before the rains of last year, still continue in excellent order, and afford comfortable accommodation to the Europeans at Dharwar. They combine bath-rooms, cookrooms, necessaries, &c., gunsheds, stables, workshops; in fact all the buildings wanted, and will last well for some years yet, until permanent barracks are decided on; for these last an immense deal of trouble has been taken in this office. Plans for single-storied barracks, with every detail of out-buildings, estimates, &c., were at last, after being returned for repeated alteration to satisfy all parties, prepared and highly approved by the local Military authorities, but returned from Bombay, owing to the determination taken of erecting Military barracks of many stories. For these latter, an elaborate plan, made out in the strictest conformity with the orders received, and with considerable thought and labour, was prepared, but appears to have arrived too late in Bombay for consideration with the others, as it was returned back to me almost as soon as received. I mention these plans, as, for the last year, they have occupied much of my time and attention, and I could have wished that the last designs, at any rate, should have repaid the trouble bestowed upon them, by receiving consideration with those from other offices. I have some satisfaction, however, in knowing that in both cases the designs were approved—the first by Major Graham, the second by Major North, respectively, the Superintending Engineers at the time of sending them in.

24. When the rebellion at Nurgoond broke out (as from the suddenness of the affair I supposed that there would be a difficulty in supplying a special Engineer officer at a moment's notice, and being in my own districts, I took the responsibilty on myself,) my Assistant, Lieutenant White, went out at once and joined Colonel Malcolm, and was present in the skirmish which determined the retreat of the Chief; he appears to have behaved with judgment and discretion. I followed myself immediately with the reinforcement, taking such stores as I could hastily collect, only to find the strong place abandoned, owing to the unaccountable panic of its owner, who could, at any rate,

BELGAUM
DHARWAR
GOA
KANARA
SUNKESHWUR
SIRSEE
YELLAPOOR
KUMTA
HONNULLY
SHIKARPOOR
BANKAPOOR
HUVINHUDDAGULLY
HURPUNNULLY
BASWAPATAM
BELLERY
SKETCH MAP
OF THE
DHARWAR COLLECTORATE.
Scale 8 Miles to an Inch
Signed C. Clerc, Lieut.
Acting Assistant Engr. C. D. C.
June 5th 1832.

have held it for some days. I afterwards undertook, at Colonel Malcolm's request, such petty works as were necessary to accommodate the European garrison, as Lieutenant Sellon, who was deputed to blow up the defences, had no establishment or means of doing so. The Europeans were, by a few alterations and improvements of existing buildings, comfortably lodged till the place was abandoned.

27. It is ordered that a Sketch Map should be sent with these Annual Reports; but such Sketch Maps take time and labour to prepare. In the published Annual Reports for 1856-57, the Sketch Maps have all been lithographed, and I presume that copies of them are in the Chief Engineer's office. I therefore send with this the lithographed sketch out of the copy of the Selections sent to me. The additions which are necessary to explain this report are most trivial; I have marked them in black ink. I should feel obliged if another copy to replace the one I have thus sent can be furnished me.

Extract of a Memorandum by Major C. F. North, Acting Superintending Engineer, Southern Circle, dated 27th May 1859, *submitting the above.*

Instead of the rough wooden bridges for the Ayly and Turwar rivers, on the military cleared road from Dharwar to the Goa frontier, alluded to in the 16th paragraph of Captain Playfair's report, I recommended bridges with masonry piers and wooden superstructure,—the bays to be about 30 feet span. I am of opinion that this construction would be found more economical ultimately than one entirely of wood; because Captain Playfair proposed to support the roadways on piles of green timber, to be obtained close to the sites of the bridges, and to be felled for the purpose and driven at once without any seasoning. Such piles would speedily decay, and the replacing of a pier would be difficult, and could not be undertaken until a pile-driving engine were brought, perhaps, from a considerable distance to the spot. The repair of decayed wooden superstructure on masonry piers would be easily accomplished. If traffic with Goa is anticipated to pass along this line, the more permanent the bridges and drains are made the better. I approve of Captain Playfair's method of repairing unmetalled roads and cleared tracks, by having the worst parts first attended to; but I think that bridges and drains should be always separately

estimated for, and should not be paid for out of the 20 to 40 Rupees a mile allowed for the repairs of such roads.

2. With reference to the latter part of paragraph 19, the proposal to withhold Government assistance from the construction of tanks, wells, or reservoirs for drinking-water, unless it were first distinctly understood and settled that the water was to be free to all castes, from Brahmin to Dher, would virtually be to exclude the higher castes from the use of those receptacles, and they would consequently not contribute to their construction. It is almost always possible to build transverse walls dividing off one or more compartments for the use of the lower castes.

4. The temporary Pendalls for European troops in the Fort of Dharwar, referred to in paragraph 23, are very good, and with the usual ordinary repairs, may be serviceable for the next ten years or more. The Fort of Dharwar is in a very dilapidated state; so much so, that it is questionable whether it would be worth while to repair it. If it is repaired, there would be no necessity for building upper-storied barracks inside it. If it is not to be repaired, the barracks might be on the proposed upper-storied defensible plan.

Extract of a Report by Captain Dickinson, Executive Engineer, Belgaum and Kolapoor, of his Operations during the year 1858-59.

1. Though a work properly belonging to the year before, I cannot pass over the Belgaum temporary barracks, which have been the cause of some correspondence during this. They were ordered to be thatched buildings, and were constructed in an extraordinary short time to meet the wants of the hot weather of last year, and of such materials as the neighbouring jungles afforded. They are indifferent thatchers at Belgaum, and but few of them; and the grass that was procurable was not of that description which is used in places where thatched roofs prevail; the consequence was, the roofs at first leaked. Their situation too, I think, was faulty—very exposed, and where, if permanent barracks were ever to be built, enclosed verandahs, with seegres constantly alight, would be necessary to keep the inner barrack-room dry.

2. In all the buildings in Belgaum, which have been very numerous during the year, a marked improvement may, I think, be

observed in the masonry work. Close joists and good bonded walls are no longer the exceptions to the rule; the carpenters' work, too, I think is improving. Major General Waddington's scantlings of roof timbers (jungle-wood) have had a fair trial here, and answered. I use them, with the exception of giving an entire inch or 1½ inch to the depth of the tie-beams, instead of making them square. A shed for ambulance, finished about this time last year, has a jungle-wood (Muttee) tie-beam only 4 inches square, the span being 24 feet, and is a good specimen of our late chief's roofs.

5. It would have been a great improvement on the sanction of Rs. 300 a mile, accorded last year to the opening-out of roads to the top of Mangilly, Chorla, and Tulleewaree Ghauts, if it had extended to the foot of the ghauts, or the boundary of the Goa frontier. I do not mean to say that for Rs. 300 a mile I could make a first-rate ghaut road, but for that small sum, I feel very sanguine that I could make three better ghaut roads than the present Ram Ghaut. The improvement of the Mangilly Ghaut, and the road from its foot to Baitsee (the latter some ten miles), would relieve, I have every reason to believe, the Ram Ghaut of every bit of the bullock traffic. Those journeying to Belgaum and the districts east would leave the new road at Coonkoombe and track cross *viâ* Tulowreh, Mawnlingeh, and Toodia (written Toorgeh in the sheets of the India Atlas), making the distance about the same between Vingorla and Belgaum, while the districts south and south-east would benefit still more. On the Chorla Ghaut the Custom's Carcoon is allowed to spend some 80 Rupees, not per mile, but altogether—a sum quite inadequate. It is very painful to see the bullocks toiling up these ghauts—many with their hoofs split and cut about and bleeding; in places the tracks are so narrow, that the traffic gets jammed, and both the up and down parties are delayed in reaching their encamping ground.

7. A road from Nundighur to Beedee and on to the Dharwar road near Kittoor, as well as a road from Beedee to Dharwar, south towards Hullial, on the south border of the collectorate, was well commenced, when it was stopped with the other works, and if not done something to, the money expended (partly private contributions) will have been thrown away. An estimate for the repairs of these roads this season, amounting to Rs. 4,413, has been submitted.

Churches, Burial-grounds, &c.

1. Belgaum Cantonment Church; sanctioned Rs. 29,427; has its foundations laid; was stopped with other public works. Our service is now conducted in a very inappropriate building, not large enough for the station, and altogether bad. It is earnestly to be hoped that the church may be proceeded with after the rains.

2. Kolapoor Church, sanction for Rs. 5,887, is wanted now more than ever, since Kolapoor has become a station for European troops. The work was stopped with the others immediately after it was commenced.

3. Kulladghee being also a station where European troops are now located, a Church is much wanted; this want is, however, being met by private subscription.

OFFICE ESTABLISHMENT.

Available.

1 2nd Class Accountant.
4 Clerks (including one Storekeeper).
1 Chowkedar.
2 Peons.

Desirable.

1 1st Class Accountant.
5 Clerks (including one Storekeeper).
2 Carkoons.
1 Store Carkoon.
1 Draughtsman.
2 Chowkedars.
4 Peons.

In explanation of the above, it is necessary to bear in mind the different amount of labour that must be in the offices of Executive Engineers who have the charge of extensive districts, and the execution of numerous works departmentally, and those who have smaller districts, who can indent largely on contractors. In the list of works executed during the year, but one is contract work. Both my English and Mahratta correspondence is very great; the numbers of Maratha Muster Rolls, figured Abstracts, &c. that have to be kept and examined, is more, I think, than I have credit for;

and the labour in making the bills, which show the rate at which each separate item in one work has been executed, down to fractions of pies, is enormous. All these combine to render necessary a larger Office Establishment then even the latest rules have given me. My store accounts are very responsible ones; and the stores, for want of space, being distributed between the camp and the fort, require two Chowkedars to look after them. The necessity for continually sending Pattywallas with convoys of carts for material is the cause of my asking for two more; the want of a draughtsman on the Permanent Establishment, and my ability to keep him in full work throughout the year, I explained last year.

The establishment of a Depôt for plant has, I am glad to see, attracted the notice of Government. In a letter, No. 1632 of the 15th September last, I gave the details of a steam Saw Mill, which I begged to be allowed to get out from England; but I regret to have received no reply to this communication. I included its cost in my estimates for the several new Artillery and Infantry buildings, but there it elicited no remark. With the present scarcity of carpenters, &c. it is much needed, and might have been got out by the time the new Barracks, &c. are ordered to be commenced.

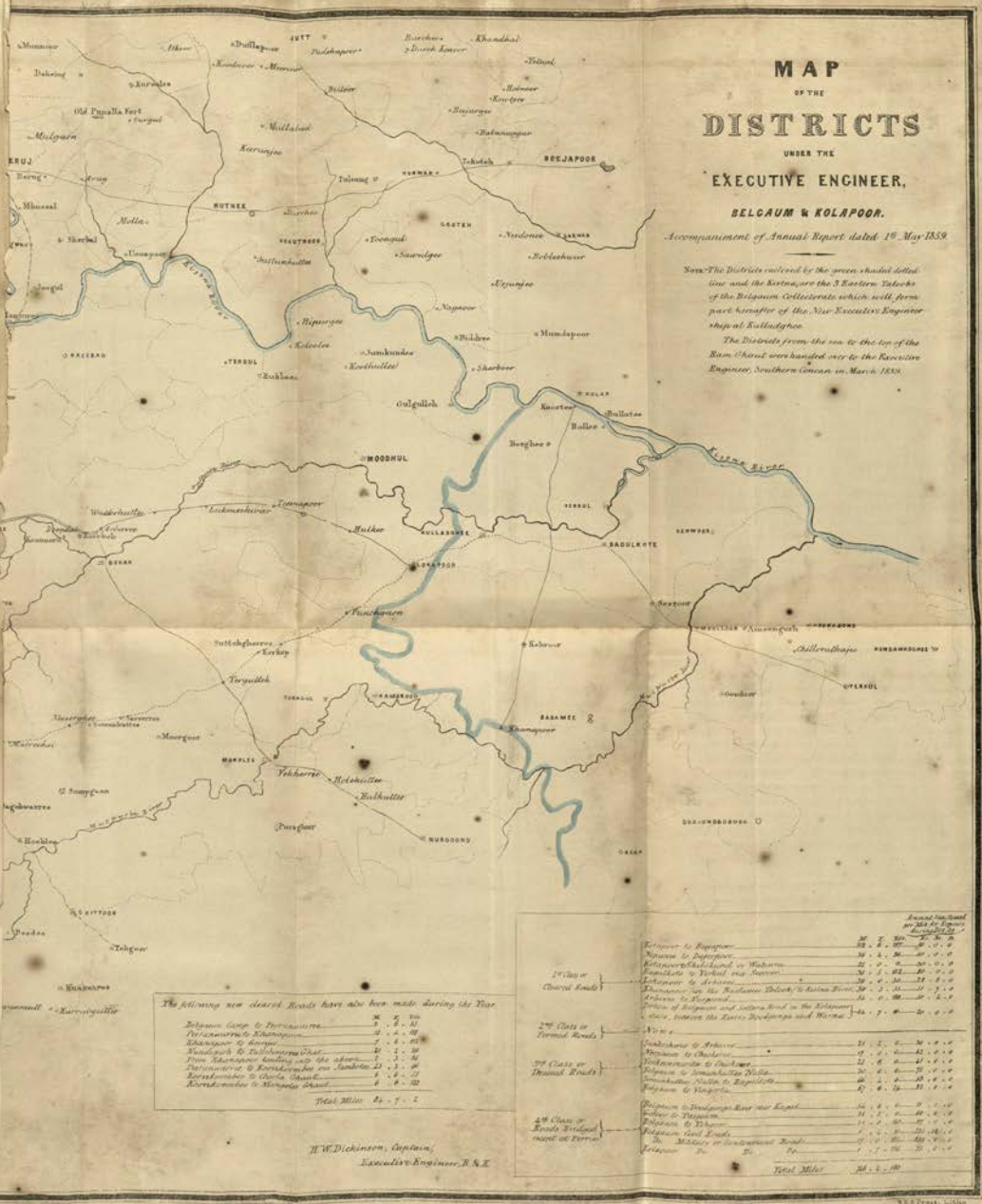
The supply of labour, skilled and other, is a subject requiring early consideration, if the numerous Military works projected are to be carried out in any reasonable time and cost. The Government Notification of the 5th January last, prohibited all Executive Engineers, under penalty of Government's severe displeasure, to apply to the Magistrates for any assistance. In answer to a letter, dated 4th November 1858, I wrote to the Collector and Magistrate, applying to him for assistance in opening out the roads to the Chorla and Mangilly Ghauts, the Collector and Magistrate tells me, that if the present rates of pay offered are not sufficient to attract the people from there ordinary occupations, the offers should be raised till they are sufficient for that purpose, and that he will not press the men to attend against their will. Against the latter I have no objection to make, but to the former I do object; the whole tone of the country is taken from the Collector and Magistrate, and his views, as enunciated in the former, though written in English, soon became known throughout the length and breadth of the collectorate. The answer always given to those who were sent to collect Biggaries was, we need not go unless we like;

and we wont. An increase of upwards of 30 per cent. on the ordinary price of labour in the districts failed to bring them in, and the roads were chiefly executed by drafts from the Goa and Sawant Warree territories at these increased rates, which, in round numbers, may be said to have reduced the sanction of Rs. 300 a mile 25 per cent., or to Rs. 225 a mile. At the present moment, in Belgaum I could employ nearly double the number of carpenters, bricklayers, and unskilled labour that I now can get. I have numerous logs of wood in the Canara jungles that I cannot get carts to bring in. I am afraid to ask the Magistrate for assistance, and doubt what Government may consider an emergency to authorise my applying to them for assistance. It seems useless to allude to such a state of matters without offering some plan for getting out of it. The constantly raising prices till a sufficiency of labour is collected, is simply ruinous. I think the difficulty might be met by a certain rate of pay being fixed for each class of workmen, which they should be compelled to accept if they work at all for hire,—just the same as the charges are fixed for Railway travelling per class, Buggywallas, and riding carts in Bombay—or what is more to the point, Palkee bearers. At present the different Public Departments at one station are at liberty to compete against each other, and the prices allowed to Railway Contractors allow them to outbid the Department Public Works altogether. This system I really think it is in the power of Government to upset, and to put on a footing just to all parties.

I am not disposed to shrink from any work, but I respectfully think the transfer of the charge of road-side trees to Department Public Works is a mistake. It would be all very well if I had constantly works going on near the several lines or roads; but I have not; more especially during the hot weather, when the trees require more tending and watering. The road repairs do not commence till long after. The local civil authorities can look after them much more economically, and I would suggest their being retransferred to them.

My office establishment have continued to work early and late. It has been improved during the latter end of the year by giving me an Accountant; but as well as I understand his duties, the Executive Engineer is his security, which is hardly carrying the project which was to relieve the Executive Engineer of responsibility to the Auditor of Public Works Accounts.

Scale of 8 Miles to an Inch.
Executive Engineer's Office, Belgaum, 8th Kolapoor
Belgaum 29th May 1858
W.W. Dickinson, Captain,
Executive Engineer, B.S.C.
The following new cleared Roads have also been made during the Year
Belgaum Camp to Parvaz
Parvaz to Khanapoor
Khanapoor to Anegoor
Nandgad to Pachkanroo
From Khanapoor leading to the above
Parvaz to Kurtkumbe on the Londa
Kurtkumbe to Chorla
Kurtkumbe to Mangeli Ghaut
Total Miles
Belgaum
Khanapoor
Nandgad
Londa
Goa
Vingorla
Malwan
Kolapoor
Walwa
Miraj
Sattara
Kaladgee
Bagulkote
Hooblee
Dharwar
Belgaum
Kittoor
Kolapoor
Ratnagiree
Vingorla
Malwan
Goa
Aguada
Nerul
Mapuca
Chapora
Pernem
Sanquelim
Ponda
Salsette
Bombay
Panwell
Pen
Roha
Mhar
Mahad
Poona
Satara
Wye
Wace
Karar
Tasgaon
Sangli
Miraj
Kurundwar
Jamkundee
Rameshwar
Kolapoor
Panalla Fort
Bhurgoon
Malkapoor
Kolapoor
Walwa



The following new cleared Roads have also been made during the Year.	M	F	Yds
Belgaum Camp to Peroonsurra	5	5	31
Peroonsurra to Khanapoor	9	2	42
Khanapoor to Gunga	7	6	88
Wundgaon to Dubbeswur Ghat	10	1	38
From Khanapoor leading into the above	1	3	84
Peroonsurra to Kuneshwurkoppa via Sunkeria	13	3	26
Kuneshwurkoppa to Chicka Chandi	8	4	71
Kuneshwurkoppa to Mirapoor Road	6	6	132
Total Miles	64	7	2

H.W. Dickinson, Captain,
Executive Engineer, B.S.N.

		Amount now cleared per Mile or Furlong		
		M	F	Yds
1st Class or Cleared Roads	Belgaum to Bagulkote	32	0	0
	Belgaum to Kolapoor	36	0	0
	Belgaum to Chickoree or Malwana	21	0	0
	Chickoree to Yerkud via Sutgee	31	0	0
	Belgaum to Arkeree	28	0	0
	Khanapoor to the Bandaree Talook to Kistna River	32	0	0
	Arkeree to Nurgoond	24	0	0
	Portion of Belgaum and Sattara Road in the Belgaum District, between the Kistna Bridge and Warna	24	0	0
2nd Class or Formed Roads	None.			
3rd Class or Dressed Roads	Gundeekeree to Arkeree	24	0	0
	Warnaree to Chickoree	17	0	0
	Kuneshwurkoppa to Chickoree	12	0	0
	Belgaum to Sunkeshwur Nulla	20	0	0
	Sunkeshwur Nulla to Bagulkote	60	0	0
	Belgaum to Yeragola	17	0	0
4th Class or Roads Finished except at Portions	Belgaum to Bendooga River near Kagul	24	0	0
	Belgaum to Hingapoor	31	0	0
	Belgaum to Dharwar	11	0	0
	Belgaum Cart Roads	1	0	0
	Do. Military or Encampment Roads	17	0	0
	Telegraph Do. Do.	1	0	0
	Total Miles	24	0	0

B.S.N. Press. Lithho

Extract of a Memorandum by Major C. F. North, Acting Superintending Engineer, Southern Circle, submitting the above.

1. The foregoing Report of Captain Dickinson seems to me unnecessarily detailed. *Repairs* might have been lumped together instead of being separately mentioned.

2. I cannot report favourably of the temporary barracks at Kulladghee. The roofs are very low, are flat, and of mud; the verandahs are very narrow, but are sloping, and single-tiled; the joists of the barrack roofs are of green baubul wood, which is fast decaying and giving way, owing to the weight of mud it has to support, and to the ravages of insects. The work, however, is as good as could be expected for the expenditure, and the buildings may last until it has been decided whether European troops are to be permanently stationed at Kulladghee.

3. Neither can I report favourably of the temporary barracks at Belgaum. In the state in which I saw them, they were unfit for European soldiers during the monsoon. This is to be attributed to their hurried construction. They could not possibly have been put up under a year if they had been tiled, and of a solidity and strength to correspond with such a roof. The expenditure on them was very reasonable. They should be removed altogether, and the materials would be useful during the approaching monsoon for other works.

9. The new Church in the Belgaum Cantonment is urgently required, and should be proceeded with to completion without further delay. There are no Churches at Dharwar, Kolapoor, or Kulladghee; but at the last mentioned station, a considerable sum has, through Colonel Malcolm's influence, been subscribed for building one, and it is hoped that Government will contribute.

10. I concur with Captain Dickinson in thinking it desirable that his Office Establishment should consist of a 1st Class Accountant; 5 Clerks, including Storekeeper; 3 Carkoons, including Store Carkoon; and a Draughtsman. Chowkeedars and Peons where required might be charged to works. There are no contractors at Belgaum. All endeavours to introduce the system of contract work have hitherto failed. I cannot explain why this should be the case; but the consequences are those stated by Captain Dickinson in the 61st page of his Report, that he has to do everything departmentally, and has a

great amount of accounts and correspondence in English and Mahrattee, with very troublesome Store Accounts. The extra Establishment Fund was no doubt a very convenient thing, but the late Major General Waddington was right in condemning the principle of it, on account of the abuses to which it was open. Everything that it served for, though even to the extra remuneration of Office Clerks for working extra time, can be charged to works.

11. As the demand for sawn timber is not likely to be permanent, there seems no necessity for sanctioning the erection of a steam Saw Mill. An 8 or 10 horse-power agricultural locomotive steam-engine would be a very useful thing in an Executive Engineer's work-yard, because it could work circular-saws, pumps, lathes, &c., and if made on Boydell's Traction principle, would be very useful for drawing trucks of timber, stone, lime, or other material.

12. I advocate a fixed "Nerrick" for labour. It ought to be binding on all Public Departments in the same station or districts, in order to prevent competition. It should be regulated and fixed from time to time by the Military and Civil Authorities. It would not interfere with the freedom of the labour market.

Extract of a Report by Mr. Armitstead, Executive Engineer, Southern Konkan, of his Operations during the year 1858-59.

5. I do not consider Waghotun a good port, and in my letter No. 524, dated 21st September 1858, paragraph 9, I clearly represented, that for several miles below that town, the depth of water was insufficient for ordinary coasting craft (in one place only four feet); it would be necessary therefore to construct a Bunder or Wharf at Amberree, or at Viziadroog, where the depth at all times of the tide would permit of ordinary steamers or ships of 300 tons burden sailing up. But I do not see the necessity of Government spending money in constructing a road all the way to Viziadroog, twelve miles from Waghotun, and which would involve the crossing of several large streams, and a branch creek of considerable magnitude. Amberree (four miles below Waghotun) I believe would be an excellent landing place, with every facility both for Commercial and *Military* purposes.

To the address of Colonel Graham, Superintending Engineer, S. C.

6. The great difficulty in the construction of the new Phonda Ghaut road, has been owing to the sliding away of loose soil or debris, formerly sustained at an angle of forty-five degrees by the roots of shrubs. This of course is not a natural angle for *soil* to stand at; and nothing but rank vegetation, such as that on the Phonda Ghaut, would ever have retained it in its primitive position. It naturally follows, that, on cutting a wide roadway out of such soil, the hill-side will slide away to the angle of repose, viz. one and a half to one. Hence the cutting of a roadway over the Phonda Ghaut has been a much more difficult and expensive operation than was contemplated when the designs and estimates were prepared. Annexed are sections of the Ghaut cuttings in difficult places, from which it will be obvious that the sliding away of the hill-side will continue, to the prejudice of the existing track, until such time as the sliding shall have terminated at the rocky ridges above, and have no further power to do injury.

Extract of a Memorandum by Major C. F. North, Acting Superintending Engineer, Southern Circle, submitting the above.

2. The port of Waghotun should not be made the terminus of a road from the Phonda Ghaut, in consequence of the shoal water immediately below it. It will be necessary to have a new line of road direct from the ghaut to Viziadroog, or to the bank of a large creek, which branches off from the Viziadroog river, about 6 miles to the eastward of Viziadroog; this line need not cross the large streams alluded to in the 5th paragraph of Mr. Armitstead's report.

3. I have already reported on the present state of the old and new lines of road on the Phonda Ghaut, and as this is the only work mentioned in Mr. Armitstead's report, I have no other remarks to submit.

Extracts of Report by Captain Kennedy, Executive Engineer, Sattara, of his Operations during the year 1858-59.

3. The chief works that have been in hand are as follows:—

Roads and Bridges.

1. Making the Kurrar and Chiploon road, *viâ* the Koombarli

Ghaut, practicable for cart traffic, in anticipation of the resumption of the entire work.

2. Converting the Wurrunda Ghaut bullock track into a cart road.

3. Clearing a line of road from the Loound to the Neera river, east of Heerdossee.

4. Rendering the road from the foot of the Wurrunda Ghaut to the port of Mahar in the Concan passable for carts.

5. Supporting the roof of the bazar Peera tunnel at Sattara.

4. The second, third, and fourth works, though executed under distinct sanctions, form parts of one and the same line, which is now open and practicable for wheeled vehicles from Loound, near the Neera bridge, to Mahar; and as from the former place there are no natural obstacles of importance to the eastward, the Sholapoor and Punderpoor districts, as well as the whole valley of the Neera, are now in direct and easy communication with the coast.

5. I shall proceed to state in general terms what has been done on the abovementioned works, noticing them in the order I have placed them.

6. Koombarli Ghaut line from Kurrar to Chiploon—

Sanctioned amount.....			Rs. 6,52,916 0 0
Expended to 30th April 1858....	Rs. 4,33,123 13 11		
Ditto -ditto 1858-59....	„ 40,368 0 6		
		„	4,73,491 14 5
Balance....		Rs.	1,79,424 1 7

I attach a sketch, showing the state of the line on the close of the official year 1857-58, as well as how it stood on the 30th April last. All that I have been doing during the past season has had for its object simply to open the line temporarily to cart traffic, in anticipation of the removal of the restriction on Public Works expenditure, and until funds are at disposal for the completion of the entire work, according to the original intention.

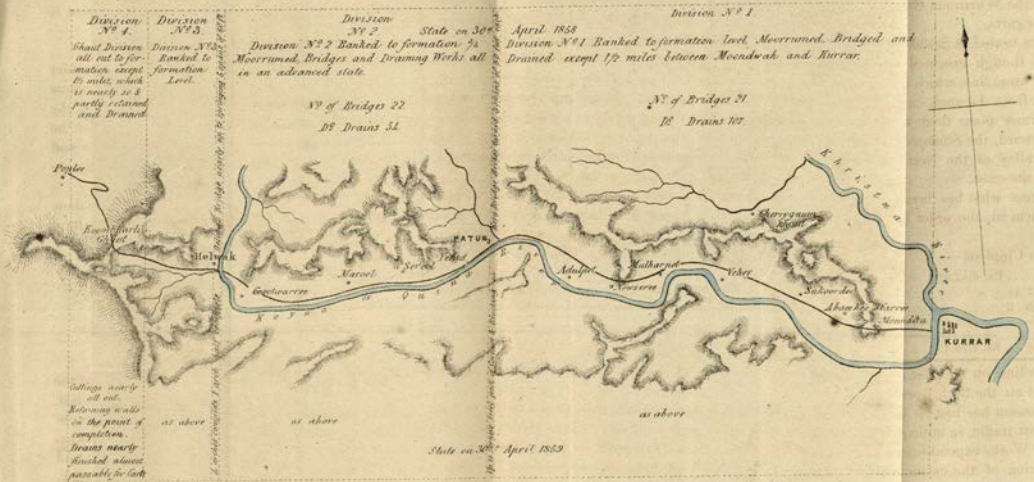
The work, therefore, that has been in hand, has merely been the completion of the cuttings, retaining-walls, and drains in the ghaut; the prosecution of the Helwauh bridge works above the springing line, and fixing the blocking and cornice to the Pattan bridge.

47. I must make, however, one exception in favour of an improvement of that portion of the main north and south line which lies between Sattara and Kholapoor; this line in its present state is

SKETCH PLAN

Showing state of the Koombharlie Ghaut line of road,

on the 30th April 1859.


Division No 4.
Ghaut Division all cut to formation except to inlets which is nearly so & partly retained and Drained.
Division No 3.
Division No 3 Banked to formation Level.
Division No 2
State on 30th April 1858
Division No 2 Banked to formation ¾ Moorrumed, Bridges and Draining Works all in an advanced state.
No of Bridges 22
Dit Drains 51.
Division No 1
Division No 1 Banked to formation level, Moorrumed, Bridged and Drained except 1/2 miles between Moondrah and Kurrar.
No of Bridges 21
Dit Drains 107.
Poonler
Koombharlie Ghaut
Helwuk
Nurcel
Seroor Vehar
PATUR
Gootsaurra
Adulpet
Mulhar pet
Nowsera
Vehar
Sukkur-ka-Mundra
Abajee Kurrar Mundra
KURRAR
Kattalwa River
Cuttings nearly all cut. Retaining walls on the point of completion. Drains nearly finished almost passable for Carts
as above
as above
as above
State on 30th April 1859.

(Sgd) M. K. Kennedy, Captain.
Executive Engineer
Sattara Collectorate.

SKETCH MAP

OF THE

SATTARA COLLECTORATE,

SHOWING THE LINE OF ROAD CONSTRUCTED, IN PROGRESS, SANCTIONED AND PROPOSED.

Sassoor
Jejooree
Indapoor
Ankloy
Pandeerpoor
Dunphuckey
Mangulwara
Hedgunta
Mirajgee
Tasgaon
Kurrehad
Kunehgam
Moorj
Hulnee
Sherbat
Ekdalpoor
Mundapoor
Nuslapoor
Baleegaon
Wurth
Kurhad
Beejapoor
Hoonur
Jutt
Dusgaon
Kenaree
Hulkee
Sanglee
Kuppee
Wangee
Sonkee
Thoseegaon
Kurrelee
Mulkapoor
Rulapoor
Chiplown
Khair
Ambola
Tablebunder
Jaolee
Wace
Kurrelee
Kuttum
Wuttumanjee
Kelapoor
Patun
Kolapoor
Ambla
Kutalee
Kurrelee
Wahoor
Thorgaon
Deegwadee
Kurrelee
Kuttum
Kurrelee
Kurrelee
Kurrelee

positively disgraceful, considering that it is a portion of a trunk road of the utmost importance in a Military, Commercial, and Postal point of view. The sooner this gap, which dislocates the communication with the Southern Mahratta Country, &c., and between the Poona and Southern Divisions of the Army, is filled up, the better; estimates for effecting all that is needed have been submitted, approved, and sanctioned, and the work would soon be done if permission to proceed with it were accorded.

Extract of a Memorandum by Major C. F. North, Superintending Engineer, Southern Circle, submitting the above.

1. The Kurrar and Chiploon line of road is very creditable to Captain Kennedy. I found it in April very nearly ready for being thrown open to cart traffic. The part from the foot of the Koombharli Ghaut to Chiploon or Gowulkote has not yet been commenced; but I am informed that the survey and estimate have been prepared by the late Mr. Armitstead, and will shortly be forwarded by his successor, Lieutenant Holland, for sanction. The Koombharli Ghaut is well lined out, and appears to have been substantially constructed. The bridge over the Quoina at Helwak, of which photographic views are given in the Report, is very well built, and is remarkably cheap. The only fault I have to find with it is, that the roadway between the parapets is too narrow by four or five feet. The jungle-wood trestle-centrings used in this bridge were very efficient.

6. I recommend the immediate construction of the line of road from Sattara to Kolapoor, as advocated in the 47th paragraph. In its present state, this road is a great obstacle to every kind of communication between the Northern and Southern Mahratta Countries.

9. In conclusion, I have only to add my testimony to that so frequently recorded by my predecessors, regarding the zeal, energy, and efficiency of Captain Kennedy as an Executive Engineer. His reputation already stands most deservedly high in the estimation of Government, and his last year's work will not diminish it.

Extract of a Report by Captain W. Goodfellow, Executive Engineer, Sholapoor District, of his Operations during the year 1858-59.

6. On irrigational works and wells, Rs. 3,917 have been expended.

Deducting Rs. 1,000 for sinking a well in the cantonment of Sholapoor, the money has been spent on repairs to existing irrigational works in the Indee and Barsee talookas, more with a hope to render the works partially remunerative, than to keep the same in efficient order.

7. You are possessed of information in detail which bears me out in asserting that, from a combination of causes, such endeavours as have been made to irrigate portions of this district have been eminently unsuccessful. The want of skilfully-prepared and matured projects, added to ignorance on the part of such subordinates as the late Executive Officer of this district had at his disposal for superintending important works, has resulted in a large sum of money being expended to little or no purpose.

8. The Revenue officer of the district, in writing of one of the tanks in the Indee Talooka, says:—"the 40,000 Rupees already spent we may as well forget altogether, since, if the work be abandoned, it will have been utterly thrown away; and on the other hand, if the work is placed in a serviceable condition by a further outlay, it will never produce anything like a good interest on this huge sum." The same officer again, in alluding to another tank in the same talooka, writes:—"12,000 Rupees has been expended without arresting the flow of one drop of water."

9. That such irrigational works as have as yet been undertaken in this district are likely to prove a source of unprofitable expenditure, rather than of remuneration to the State, may be a most unsatisfactory statement for Government, but one, nevertheless, which it is my duty to make, however reluctantly. So firmly was I impressed with the above view, that, when the embankment of the tank at Koodghee was breached in October last, and serious injury sustained by the embankment of the tank at Hutterghee, I delayed incurring any expenditure on the works, until I received a letter from the office of the Chief Engineer, in which Colonel Scott observed that the repairs to the tanks both at Hutterghee and Koodghee (which, although defective, are completed works) should have been executed immediately, the necessity for them became apparent, in accordance with the 12th paragraph of Government Resolution No. 820, dated 21st July 1855.

10. It is necessary to state that my reason for not carrying out requisite repairs was, that I was doubtful whether either of the tanks

could be considered completed, though the work had been stopped, accounts closed, and bill passed; yet, as neither tank had been found capable of containing water, could they be looked on as perfected or completed works? I argue not.

11. The expenditure that is now being incurred is, I am afraid, for prolonging the existence of essentially defective works,—not for remedying defects; for example, a Government Resolution a short time back sanctioned "additional expenditure" of Rs. 2,938 for "putting the tank at Koodgee, in the Sholapoor Collectorate, into as efficient a state as its defective construction would admit of." Now, the Government will be called on to sanction further additional expenditure, amounting to not less than Rs 2,500, for repairing a breach in the embankment of the above tank, caused by the defective construction; and after this work has been carried out, a remark I made a year ago, when addressing you on the subject, still holds good, viz. that, though the embankment may be thoroughly repaired at one point, there is little hope of its being ever entirely effective; besides, it must be borne in mind, that the original project was, that the tank should cost Rs. 4,000, and yield a percentage on outlay of Rs. 8. Having now cost Rs. 14,000, and the necessity for annual repairs being considered, it is difficult to conceive what (if any) percentage on outlay will be obtainable.

22. With regard to the style of Barrack and arrangement of accommodation, I cannot say more than that I have done my best. It is a very difficult subject, and one on which opinions appear to differ. The combination of ventilation and suitability of accommodation, with capability of defence, though apparently faultless on paper as a design, must, in a great measure, prove experimental in practice, more particularly with reference to the number of stories it would be desirable to have in the building.

23. The distribution of the regulated number of married men's quarters on the first floor, to correspond with space to be allotted for the cots of the single men on the floor above, is not easy.

24. A Wing of European Cavalry, not Head Quarters, may, in round numbers, be said to consist of 350 men of all ranks.

25. The regulated number of married men being at the rate of 12 per cent., gives 308 single men, and 42 married men, accommodated in one barrack, which, according to instructions received

is to be three stories high ; therefore, on the second floor, accommodation will be required for 308 men, and on the first floor for 42 married men, the ground-floor or basement being apportioned into Mess-room for men, Mess-room for Serjeants, Orderly-room, Coffee-room, Library, Workshops, and Washing-rooms, as shown in the diagram annexed.

26. The buildings for the accommodation of a Wing of Cavalry will undoubtedly, on the above plan, occupy far less space than on the method formerly adopted—of long, straggling ranges of one-storied Barracks, though I doubt whether the total cost will be much affected.

27. One of the principal difficulties to be overcome in a lofty Barrack is the arrangement of the urinaries, which, in a building of such size as to be capable of accommodating 308 men on the upper-story, it is almost impossible to arrange for, so as not to be, during some months in the year, to windward.

28. I have much satisfaction in stating that the temporary Barracks erected last year at this station, will, with an expenditure not exceeding 3 per cent. per annum—an original outlay,—answer every purpose required for some six, seven, or more years.

29. A Committee of Officers might be directed to report whether or not, if the Barracks now in use could be retained in their present state of repair, they would not answer well for the accommodation of European soldiers, until such time as, from actual experiment, it could be decided which really was the plan best suited for general adoption.

30. The advantages of such a course appear to me to be obvious.

31. The distance at which water is obtainable from the *only* site available for the permanent Barracks at this station, renders it next to impossible to carry out any arrangements as to the disposition or design of the buildings, so as to render them capable of defence. Though the question as to the site suitable for permanent Barracks was submitted to the Military Authorities by me for decision more than a year ago, no definite reply has as yet been given—a proof I imagine that some difficulty exists. If there is any probability of the opening of the Railway affecting the number of Troops to be stationed at Sholapoor, the delay in expending a sum on the permanent Barracks, larger than the total value of all other Government buildings now existing at this station, will have been advantageous.

SKETCH MAP

OF THE

SHOLAPORE COLLECTORATE,

to accompany

Annual Progress Report

FOR THE YEAR 1858-59.

Scale 16 Miles to an Inch.

Sig^d^ W. W. Goodfellow, Captain,
Exec. Engineer, Sholapoor District.

32. I believe that sites, infinitely preferable to any that the Cantonment of Sholapoor affords, are obtainable on the line of Railway from 8 to 12 miles in the direction of either Poona or Madras. The proximity of an abundant supply of good water and distance from a large and populous town, which the Railway will be sure to make much larger, are advantages of site, the *reverse* of which only are obtainable in the cantonment of Sholapoor. I would respectfully direct the attention of such as are in authority to the above.

34. Of Serjeant Campbell's behaviour and attention to his duties, I have every reason to be perfectly satisfied. He has been promoted during the past year from Assistant Overseer to the grade of Overseer. He is studying Mahratta, and will soon, I trust, be able to exhibit sufficient knowledge of the language to enable me to report favourably of his qualifications. I would respectfully suggest that *bonâ fide* expenditure incurred by European Overseers in paying Pundits, during such time as they may be studying the language of their district, be refunded, provided the Overseer pass a satisfactory examination in a moderate time. Besides claim to promotion, I am of opinion that every facility and encouragement should be offered to enable Europeans employed in the Department to gain sufficient knowledge of the vernacular, to check and control the details of expenditure of public money, accounts and memoranda of which must necessarily be kept in the Native language.

Extract of a Memorandum by Major C. F. North, Acting Superintending Engineer, Southern Circle, submitting the above.

Early in the course of next month, I purpose inspecting the tanks alluded to in Captain Goodfellow's 7th and four following paragraphs.

2. The subject of the 22nd and five following paragraphs is under the consideration of Government, I believe. When the plan of Barrack has been determined, the subject of the 29th and three following paragraphs, regarding the best site for Barracks at or near Sholapoor, may receive attention.

3. I concur with Captain Goodfellow in the recommendation contained in his 34th paragraph, that Moonshee or Pundit allowance

be granted to European Overseers who can pass satisfactory examinations in Native languages.

4. It does not appear that Captain Goodfellow has any Murramut Maistries. I would recommend that he be permitted to entertain some of them, as they are extremely useful for minor works in the districts.

Extract of a Report by Lieutenant Colonel Graham, Executive Engineer, Poona District, of his Operations during the year 1858-59.

29. The only other bridge I shall allude to, is the one partly built on the Kurra river, and now remaining uncompleted. I agree with my predecessor, Captain Duncan, that this bridge should be completed, and the sooner it is so, the better. It would be the greatest convenience to the inhabitants on both banks of the river; and I hope to hear that the Government have sanctioned its being completed at an early date, as also the bridges and drains on the direct road from the Deweh Ghaut to Jejooree, at an estimated cost of Rs. (7,892) seven thousand eight hundred and ninety-two, however Railways may hereafter take their course. This direct line to Poona will always be an useful road, and it should be completed, in my opinion, and a junction formed between it and the town of Sassoor, as proposed by me lately in a letter to the Chief Engineer.

Amount expended during the year, Rs. 840-6-2.

Extract of a Letter by Lieutenant Colonel Munbee, Superintending Engineer, Central Circle, submitting the above.

6. I would also recommend the completing, with moorum and metal, the road from Hurrupsur to the foot of the Deweh Ghaut, and bridging and draining the same; the completion of the road from Deweh Ghaut to Jejoore with moorum, and bridges and drains, and to form a junction between it and Sassoor, and bridge and drain it. The completion of the bridge over the Kurra river is very advisable, but the sanctioned amount will not be sufficient to complete it.

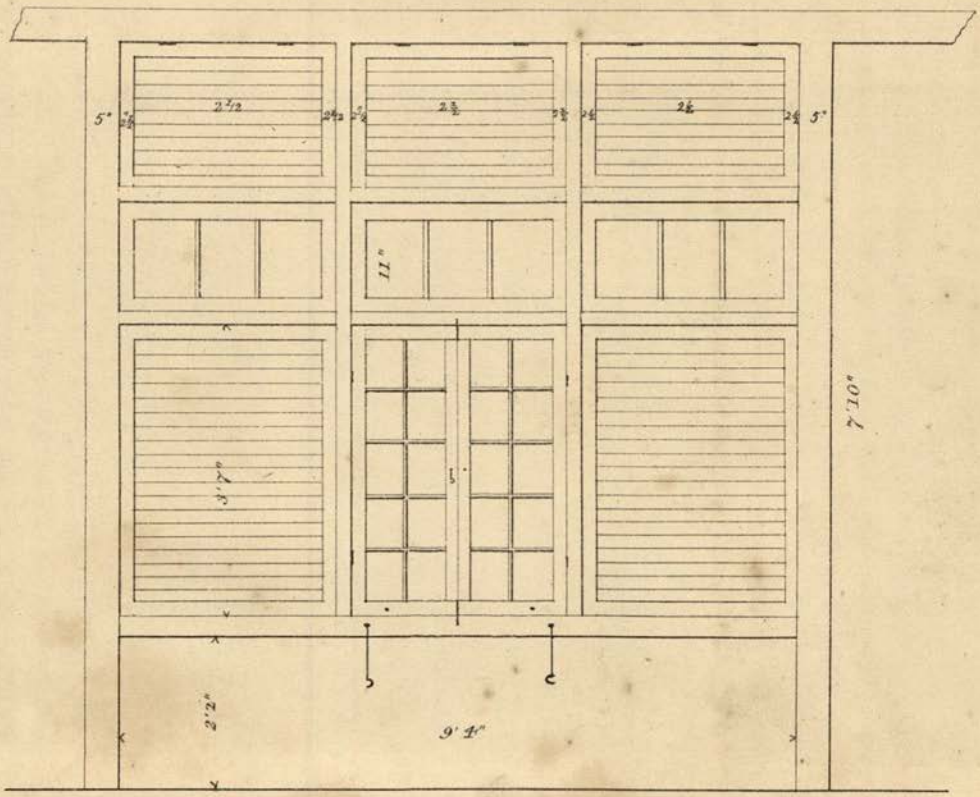
TRACE
SHEWING THE EXISTING AND PROPOSED ROADS
AS ALSO THE G.I.P. RAILWAY
in the
POONA COLLECTORATE.
Scale 8 Miles to an Inch
REFERENCE.
Metalled Roads
Moorum
Fair-weather
Proposed
Rail
Travellers Bungalow
Stepping Pandalls
Railway Stations
AHMEDNUGGER COLLECTORATE
SATTARA COLLECTORATE
Bhore Ghaut
KHEIR
POONA
SOOPEH
SHEERWUL
Kurmula
Indapoor
Pyramutee
SATTARA
Sgt. W. D. Graham, Lieut. Colonel.
Executive Engineer Poona District.

PLAN
of the
CITY OF POONA
and
Surrounding Country

Surveyed by Lieut.s Wilkinson, Scott, Aldrich & Wyatt, Royal Engineers, assisted by Mr. Thomas, Civil Engineer, in 1847.
Lithographed by Lieut.s Wilkinson & Scott, Royal Engineers.
Engraved by Mr. Thomas.
Printed by Mr. Thomas.
Sig.d C. T. Boddam, Captain
Acting Executive Engineer P. & K.

A VERANDA WINDOW.

Ghorepooree Barracks.



Exec^e Engineer's Office, P. & K.
Poona, 12^th May 1859.

Scale 2½ Feet to an Inch.

(Signed) C. T. Boddam, Captain,
Act^g. Exec^e. Engineer, P. & K.

Extract of a Report by Captain Boddam, Officiating Executive Engineer, Poona and Kirkee, of his Operations during the year 1858-59.

My predecessor, Captain Hart, in his report for 1857-58, so fully entered into these two subjects, and of the urgent necessity for the proper conservation of Barracks, that little remains for me to add, than to observe that merely an increase to the Barrack Master's Establishment will not altogether meet the difficulties of the question as to the proper means for reducing the enormous expenditure for petty repairs to buildings, since a very large share of the expenditure is occasioned by the thoughtlessness or carelessness of the soldier. To render my meaning more clear, a drawing of the windows and venetians to the Barracks at Ghorepoobree has been annexed. A soldier inside the Barrack wishing for more air, throws open the windows; he never thinks of fixing the hooks to keep them open; the consequence is, the first strong breeze blows the window back with a crash, which shivers half the panes, loosens the hinges, and sometimes the frame-work is altogether smashed,—and in a day or two a requisition, duly certified, is sent to the Executive Engineer for petty repairs. I may cite as an example, that, within three weeks of putting the Barracks at Ghorepooree in a thorough state of repair, the accompanying requisition for petty repair was sent to me.

Extract of a Letter by Lieutenant Colonel Munbee, Superintending Engineer, Central Circle, submitting the above.

5. Captain Boddam draws attention to the enormous expenditure for petty repairs to Military Buildings, which he refers to the carelessness of the soldiers in not fixing the hooks of open windows. The system of payment for any Barrack damages caused by carelessness, neglect, or wilful damage, is more rigorously enforced in Europe than in India. I do not know why, because the regulations in India are strict enough, although seldom enforced. For the specific case of the Ghorepooree Barracks, I shall endeavour to introduce a spring-fastening which will allow of the window opening, but prevent its closing until the spring is eased.

Extract of a Report by Lieutenant Melliss, Acting Executive Engineer, Northern Konkun, of his Operations during the year 1858-59.

6. The water collected by this dam* is reported to be undrinkable towards the latter end of the season, which is probably occasioned by the Bunjaree bullocks being allowed to wash in the pool; but I know so little of the tank, that I cannot offer more than a suggestion on the probable cause of its failure.

* Rurtoonda.

Extract of a Letter by Lieutenant Colonel Munbee, Superintending Engineer, Central Circle, submitting the above.

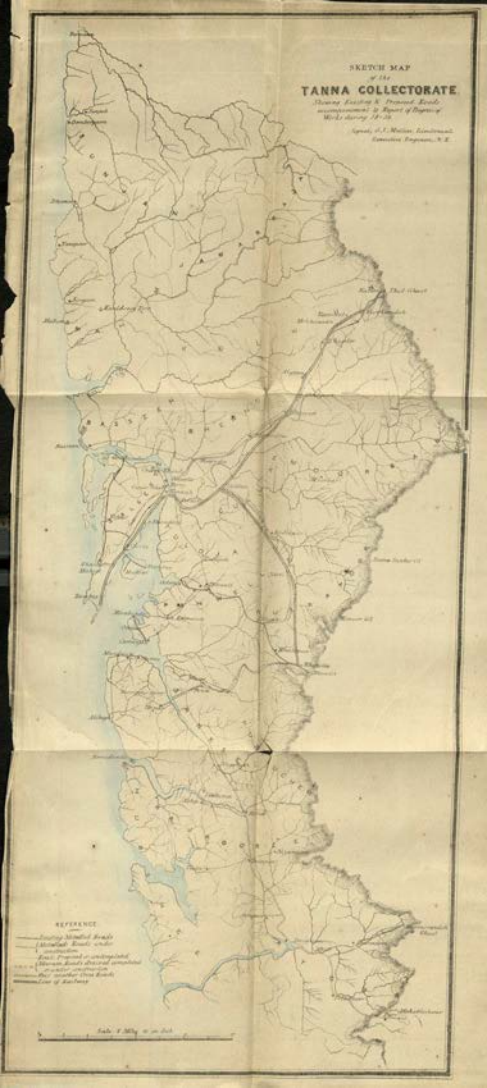
4. The water of the tank at Rurtoonda (the dam of which has been raised) is reported to become impure towards the end of the hot weather, in consequence of the Bunjaree bullocks being washed in it. The water is required for drinking, and bullocks ought to be prevented from going into it at all; but this must be effected by the orders of the Magistrate—not of the Department Public Works. Two wells were excavated in the bed of the above tank, in consequence of the scarcity of water during the hot months, but Lieutenant Melliss does not mention them.

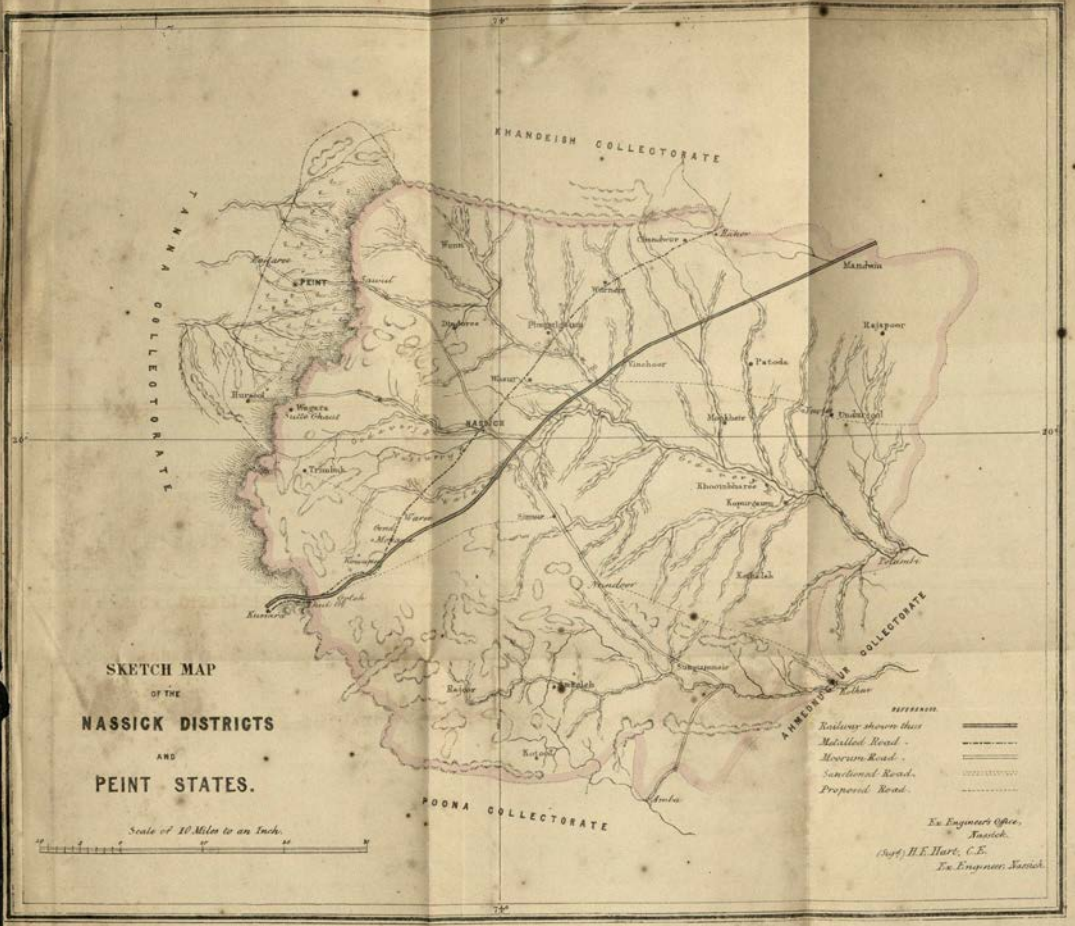
Extract of a Report by Mr. J. H. E. Hart, Executive Engineer, Nassick and Peint District, of his Operations during the year 1858-59.

The Bulsar, Nassick, and Poona Road.

10. On this line nothing except repairs has been done.

11. It is to be regretted that it should be left so incomplete, the portion between Nassick and Poona districts being impassible during the rains, on account of the number of bridges required, and nearly so during the hot weather, on account of the great obstruction caused by the unconstructed portion of the Chundapooree Ghaut. It has lately been intimated to me that sanction for the completion of this ghaut has been solicited from the Supreme Government.


SKETCH MAP
of the
TANNA COLLECTORATE
Showing Existing & Proposed Roads
accompanying 'A Report of Progress of
Works during 19-20'
Agents, J. J. Watkins, Lieutenant,
Executive Engineer, N. Z.
REFERENCE
Existing Metalled Roads
Metalled Roads under
construction
Roads Proposed or unsurveyed
Formed Roads Proposed completed
or under construction
Other Native Tracks
Line of Railway
Scale 4 Miles to an Inch



SKETCH MAP
OF THE
NASSICK DISTRICTS
AND
PEINT STATES.

Ex. Engineer's Office,
Nassick.
(Sgd.) H.E. Hart, C.E.
Ex. Engineer, Nassick.

SKETCH MAP
of the
AHMEDNUCCUR COLLECTORATE.

SHOWING THE LINES OF ROAD CONSTRUCTED, IN PROGRESS, SANCTIONED, AND PROPOSED.

Mooroor
Dekaun
Yerla
Nizzamabad
Kurlapauum
Nanderpet
Kurlapauum
Tekur
Kurlapauum
Kurlapauum
Nowapet
Kurlapauum
Kurlapauum
Kurlapauum

Extract of a Report by Captain A. U. H. Finch, Executive Engineer, Ahmednuggur District, of his Operations during the year 1858-59.

21. Adverting to the irrigational wants of the district, it is a subject which, to the present time, has scarcely received any attention; and although the investigation of some projects has been prosecuted, no results have been obtained by which a mature deliberation of their advantages might have been arrived at. The subject is quite in its infancy; and, as previously recommended by Captain Scott, when Acting Executive Engineer of the station, it is highly desirable, with the object of bestowing the proper amount of attention that the subject is deserving of, that a separate establishment should be entertained, for exclusively prosecuting inquiries with respect to the irrigational resources of the district. On a general inspection of the northern portion of the Zillah, I submitted to the Collector a brief statement of the principal features that the country possesses for the extension of irrigation in that locality. It was clearly apparent, that throughout the whole of the talooks lying to the north of Ahmednuggur, embracing the Rahooree, Newassa, and Sheogaum divisions, the only streams whose waters could be untilized with advantage, were the Moola and the Pruwara rivers, and a smaller one, the Dora, flowing through the Sheogaum Talooka. The places on these rivers, which appeared to offer facilities for the erection of irrigational dams, were at Wuzur and Lakh, on the Pruwara river, at Nandoor, on the Moola river, and in the vicinity of the village of Autire, on the Dora river. It will be labour advantageously expended to have these sites thoroughly and efficiently examined; as, should they prove to be properly adapted for the purpose in view, there cannot be any doubt, from the large supply of water that continues to flow in their beds during the whole season, that the schemes would be found highly beneficial and remunerative.

Extract of a Letter from Lieutenant Colonel Munbee, Superintending Engineer, Central Circle, submitting a Report by the Executive Engineer, Khandeish District, of his Operations during the year 1858-59.

2. When on my tour, I inspected the temporary Pendalls, with

necessary out-houses, for the accommodation of European troops travelling by bullock train at Malligaum, Dhoolia, Sawulda, and Sindwa, and officers' quarters at Sawulda and Malligaum, and found them completed in a satisfactory manner, with the exception of that at Sindwa, which was not completed sufficiently to enable me to form a judgment.

3. I also inspected quarters for Inspector Transport Train, and temporary Barracks, &c. at Malligaum, and found them well built.

4. The permanent Barracks at Asseerghur had not been begun. There has been sufficient correspondence to make it unnecessary for me to write more here. The Commissariat shed in the Petta of Asseerghur was nearly completed; it was satisfactorily executed, except that the round rafters with which the roof was being constructed looked too small. I pointed it out both to the Executive and Assistant Executive Engineer, and it has probably been rectified.

5. I am afraid the Well in the Arsenal court-yard at Malligaum, would not contain a supply of water in the hot weather, if drawn upon to any great extent.

6. As it appeared that the brass stays of the Lightning Conductor went into the Magazine, and as that might *perhaps* have caused alarm, if not danger, the circuit has been completed by putting the lower part of the wire stays in contact with the lower part of the Conductor.

7. As regards the irrigational works, I have nothing to add to the report; but with reference to the road deviation between Panakheira and Sawulda, I fear that there must be a considerable excess, and the Acting Executive Engineer, Khandiesh Collectorate, is preparing an estimate to enable me to report the amount for which additional sanction is required.

8. The portion of road between Neeldana and Dabasee is reported to have been at a stand-still for want of labourers, although urgently required.

Extract of a Report by Lieutenant J. G. Melliss, Executive Engineer, Mhow, of his Operations during the year 1858-59.

21. At Indore, an upper-storied barrack for two Companies of Europeans has been commenced, on the Bengal standard plan. The

SKETCH MAP
OF
CANDEISH.
Scale, 8 Miles to an Inch.
REFERENCES.
Proposed Mineral Railway, Capt
Railway Inst. Engineer, Candeish.

lower story is half completed, also trusses of roof; in fact, nearly all the wood-work ready. There is great difficulty in getting works executed at Indore, as the Department has to enter into competition with the Public Works Department of His Highness the Rajah of Indore, now busily engaged in some large works, for which people and materials are brought from all quarters. This work has, as far as it has gone, been exceedingly well-built by a Maistry by name "Alla Bukkus," who came from Khandeish. I have not a man who could have turned out such work; or, in fact, one who could have carried it out at all, except Dajee Abajee. I very much doubt whether Soldiers would not prefer a building with fewer walls and verandahs. The main room will, I believe, be found very dark, while the number of walls will prevent air circulating freely, and the large mass of masonry will never cool.

30. At the beginning of this official year, the appointment was under the Bengal Government. Of the Overseers there under me, one died in May, a second was tried by Court Martial and reduced, a third sent back to his Regiment, a fourth, who knew but little of his duties, returned to his Presidency; and this being the state of my Establishment for the last six months of 1858, I was compelled to suspend even works ordered on emergency.

32. I next come to the Sub-Overseers (3rd Class); and of these I would say, generally they are young boys fresh from school, and they are just what school-boys may be expected to be when first free from control—very idle. They have received some theoretical instruction, but have never seen bricks and mortar put together, and they are now placed in sole charge of important works involving a large expenditure. They are all very young, and are supposed to give orders to old men who have much more experience than they have. They have not the tact to manage men. These youths, coming from a different part of the country, and supplanting those who were formerly in employment, receive but little assistance in the so-called Maistries, who laugh at them and their new ideas, which they have not sufficient confidence in themselves to carry out; the result is, that they are merely tools in the hands of their Maistries. They do not know good materials from bad, and dealers consequently palm off any inferior goods on them. I do not consider that these youths are in a proper position. They should be apprenticed to some older

Overseers in charge of works, and not at once be placed in separate charge of important works; with the exception of Overseer Dajee Abajee, who is employed out of camp, I have no man of the department who is really capable of being entrusted with the execution of any but very trifling works, and there is a prospect of a very large expenditure on barracks during the year which has now commenced. There are not even Maistries procurable in Mhow, for there have been no Public Works undertaken in Mhow for years; in fact, very few in the Division: and for the bridges on the Agra and Bombay road, there were usually a large number of European Overseers employed.

33. While the Superintending (subordinate) Establishment is in the state described, the Office Establishment is in a worse state. A Second Class Establishment has been sanctioned; but the men procurable at Mhow, for the pay of a 2nd Class Establishment, would be rejected elsewhere for an Establishment of the lowest class. Whereas the amount of office work and expenditure are probably now not less than that of any other division. My Accountant is industrious and attentive to his duties; but never having been in an Executive Engineer's Office, and never having seen any accounts kept before, he can scarcely be expected to give the assistance in keeping accounts, and in transacting the business of the office, which is required from one in his position; the Second Writer, one of the old Establishment, is retained, as he is the only man who can give information regarding the former Bengal correspondence and accounts: the remainder are very inaccurate copyists.

Extract of a Letter from Lieutenant Colonel Munbee, Superintending Engineer, Central Circle, submitting the above.

7. There had been so much dishonesty on the part of the subordinates, European and Native, that it was a bad school for the young and inexperienced men of the Public Works Department; and I am still at a loss to know what remedy to take, or where to get more experienced men to send to Mhow. I could only do so by crippling other Executive Offices. The addition of Mhow, Indore, Neemuch, Nusseerabad, and Ajmere, with all the subsidiary stations, to the limited Public Works Establishment of this Presidency, as mere

temporary appendages, has been a very severe tax; and I respectfully beg leave to point out, that the time has now come, when some permanent arrangement might with advantage be made. The Second Class Establishment, sanctioned for the Executive Engineer, Mhow, is not sufficient; the difficulty of procuring Clerks is so great, and the price paid as wages to Clerks in other offices so high, that a First Class Establishment would not be much better. I can only recommend that it may be treated as a special case, and the Executive Engineer allowed to hire such Clerks as may be necessary, at such wages as he can get them for, in the manner recommended by Captain Davidson, in the latter part of his 34th paragraph.

Extract of a Report by Mr. W. Barton, First Assistant Executive Engineer in charge Surat and Broach, of his Operations during the year 1858-59.

6. In the Gogo districts, on the west side of the Gulf of Cambay, the road-works still remain in abeyance; the portion of the Gogo and Ahmedabad road, from Gogo to Vertez, requiring only the completion of one or two bridges, remains incomplete; though open to traffic.

7. To the road-works between Vertez and Dhundooka, nothing has been done to forward their completion; the emergent and ordinary repairs have been continued, but the work remains perfectly useless: no portion of it is fit for traffic.

8. The embankment from the town to the port of Dhollera, noticed in the last year's Review as completed, after substantial repairs rendered necessary by the effect of the first monsoon upon the earthwork, was thrown open for traffic. The scheme may be looked upon as an experiment, but it has proved a most successful one. Government sanctioned the levying of a toll, which has been imposed during the past season, at the rate of two pice for every head of cattle. The gross amount collected in one season has amounted to nearly Rs. 2,000, originally projected by Captain Trevor; the work was constructed under his orders when in this department, and on his giving over charge of this office, the future management was transferred to him.

Piers, Jetties, and Wharfs.

9. The chief works in the shape of Piers and Jetties are—1*st*, the Chaput Bunder, adjoining the Castle of Surat. Its utility is unquestionable, and the activity prevailing during the fair season, is sufficient to show how well it is appreciated. The extension already advocated, and already provided for by Estimate, is a matter of expediency. With the old Cotton Bunder closed up, the accommodation provided by this single pier is not nearly adequate to the even ordinary wants of the Mercantile community of Surat.

Extract of a Memorandum by Captain Bell, Acting Superintending Engineer, Northern Circle, submitting the above.

Roads and Bridges, paragraph 8.

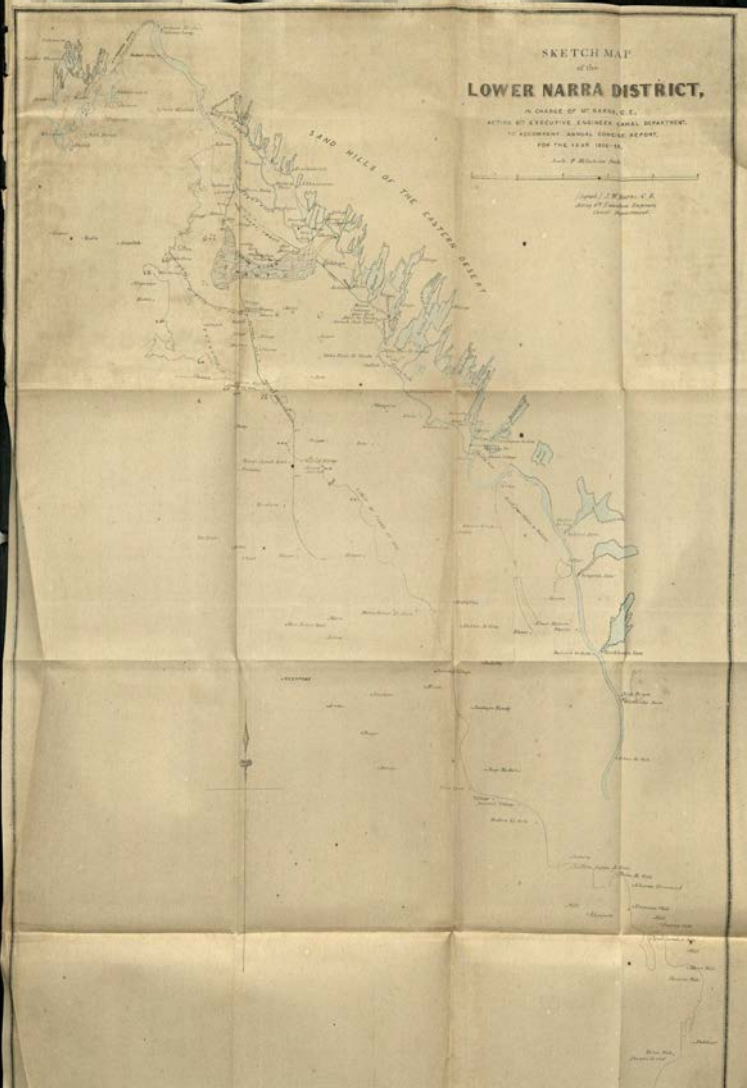
The Dholera embankment, extending to the Khoon Bunder, is found to yield such a return, that Captain Trevor has submitted an estimate, which will shortly be forwarded, for providing additional wharfage.

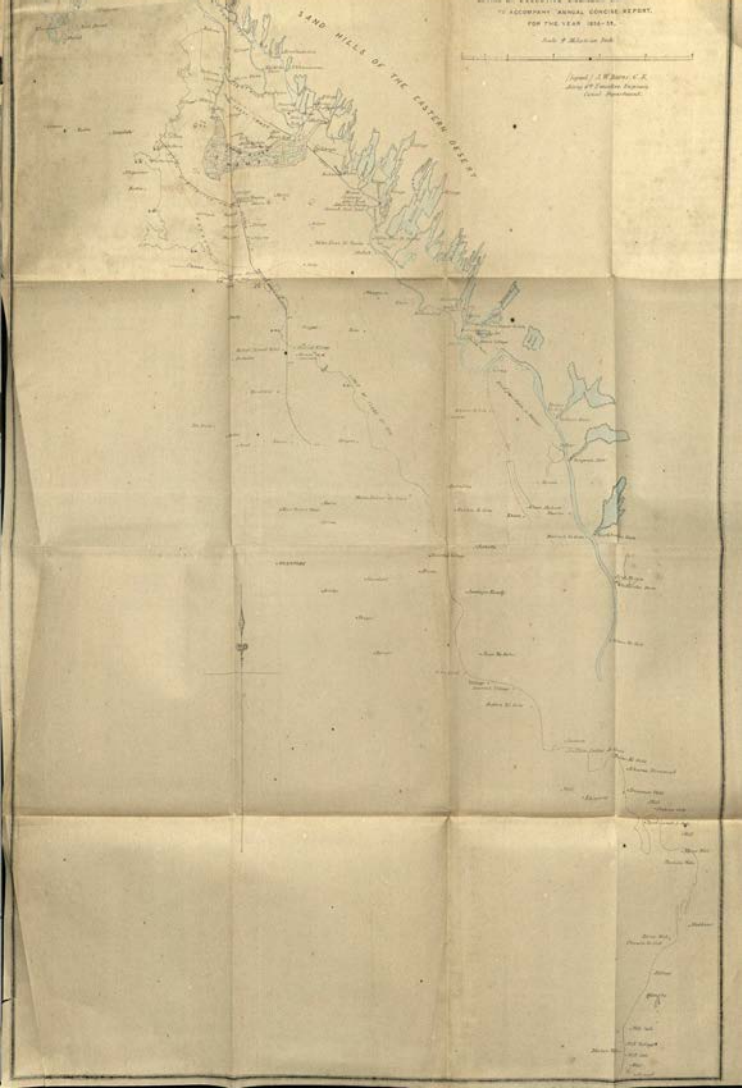
Piers and Jetties, paragraph 9.

4. The work of extending the Chaput Bunder, sanctioned, but subsequently suspended with other Government works not absolutely necessary of execution, is recommended to be resumed, as there is a great demand for additional Wharfage.

Extract of a Report by Lieutenant J. R. Maunsell, Executive Engineer, Deesa and Aboo, of his Operations during the year 1858-59.

14. A considerable loss accrues to Government in the scarcity of small silver and copper coins. I have frequently endeavoured to arrange with the Deputy Collector, Ahmedabad, for the regular transmission of small change; but the scarcity there precludes any being sent up, I believe. In Deesa, for some time the rupee has been changed for 15 annas, and at Aboo for the absurd rate of 13 annas; the change obtained also, is not what is usually termed Company's pice, but frequently the Native coin, which I can only designate as lumps of copper. In paying workmen weekly, which is the only term for which they will accept labour at Aboo, conse-


SKETCH MAP
of the
LOWER NARRA DISTRICT,
IN CHARGE OF Mr HARRIS, C.E.,
ACTING AS EXECUTIVE ENGINEER CANAL DEPARTMENT.
TO ACCOMPANY ANNUAL CONSULS REPORT,
FOR THE YEAR 1886-87.
SAND HILLS OF THE EASTERN DESERT


SAND HILLS OF THE EASTERN DESERT

quently a considerable loss takes place. It may be added that, in changing the rupee, one obtains the value of 13 annas in Native copper; yet frequently on tendering the Native copper to tradesmen and others, it has been refused. I do not know if the Military Authorities have made any representation of the matter, or whether they are supplied with sufficient copper coin to pay the men; otherwise the loss of 3 annas in every rupee would considerably lessen the pay of a Private. In the case of a subordinate in this department drawing Rs. 100 a month, it causes a loss of nearly Rs. 20 per mensem.

Extract of a Memorandum by Captain Bell, Acting Superintending Engineer, Northern Circle, submitting the above.

9. *Paragraph* 14.—The inconvenience of loss by the exchange is very serious. As, however, Sepoys and Camp followers are sufferers, every effort is doubtless being made to remedy the evil.

Extract part of a Report by Mr. J. W. Barnes, Acting 6th Executive Engineer, Lower Narra Works in Sind, of his Operations during the year 1858-59.

* * * It has often occurred to me, that it would be both economical, and in many other respects advisable, that for Canal duties, we should endeavour to raise up a class of Surveyors from amongst the Natives of the country, by holding out to intelligent Moonshees inducement to qualify themselves for entry into the lower subordinate grades of the Public Works Department, and place within their reach copies of the numerous treaties in "Oordoo," prepared for use of the students at the Civil Engineering College, Roorkee; and if each Executive Officer were permitted to send deserving men to the Engineering School at Kurrachee, for instruction during the recess, I have no doubt we should find our present great want of suitable subordinates for Canal duties amply met.

Extract part of a Letter by Captain J. G. Fife, Superintendent of Canals in Sind, submitting the above.

The people on the Narra fully appreciate the value of this Canal (the Mitrow), and one Zemindar had such perfect faith in what was

told him about the water level, that he excavated two miles of distributing channel at his own expense, before he had ever seen water in the Canal. I think this fact worthy of record, as it is rare that Natives show such reliance on what is told them.

Extract of a Report by Captain C. J. Merriman, Executive Engineer, Kurrachee Station and Port, of his Operations during the year 1858-59.

General Establishments.

51. I now have to make a few remarks under this head; but before commencing, I beg to state that this office, from its situation, becomes a kind of depôt for all offices in Sind. This might be considered by some officers advantageous; but I think it just the contrary. All new arrivals are generally attached for a few months, and then sent up-country, when they are beginning to get useful. Sick are often sent from up-country to recruit here, and others are demanded to supply their places.

Extract of a Memorandum by Captain P. L. Hart, Acting Chief Engineer in Sind, submitting the above.

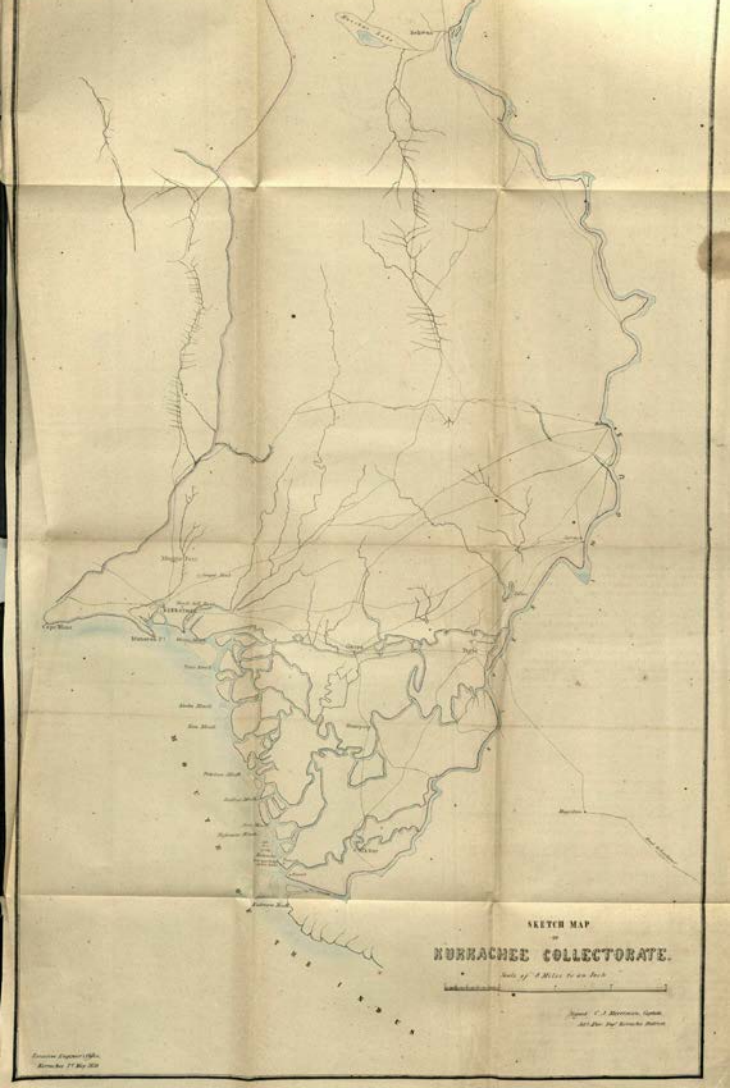
16. Captain Merriman speaks well of his Assistants and Subordinates, but considers the practice of making his office a kind of depôt for new arrivals, and sick men from up-country, a disadvantageous one. This is no doubt attended with some inconvenience, but at present there is no help for it, and the practice cannot be avoided. I have a very great objection to sending any new arrivals in the province to Central or Upper Sind during the hot season. When the system of a general and regular relief for Sind, as proposed by the Chief Engineer at the Presidency is carried out, this practice will be discontinued.

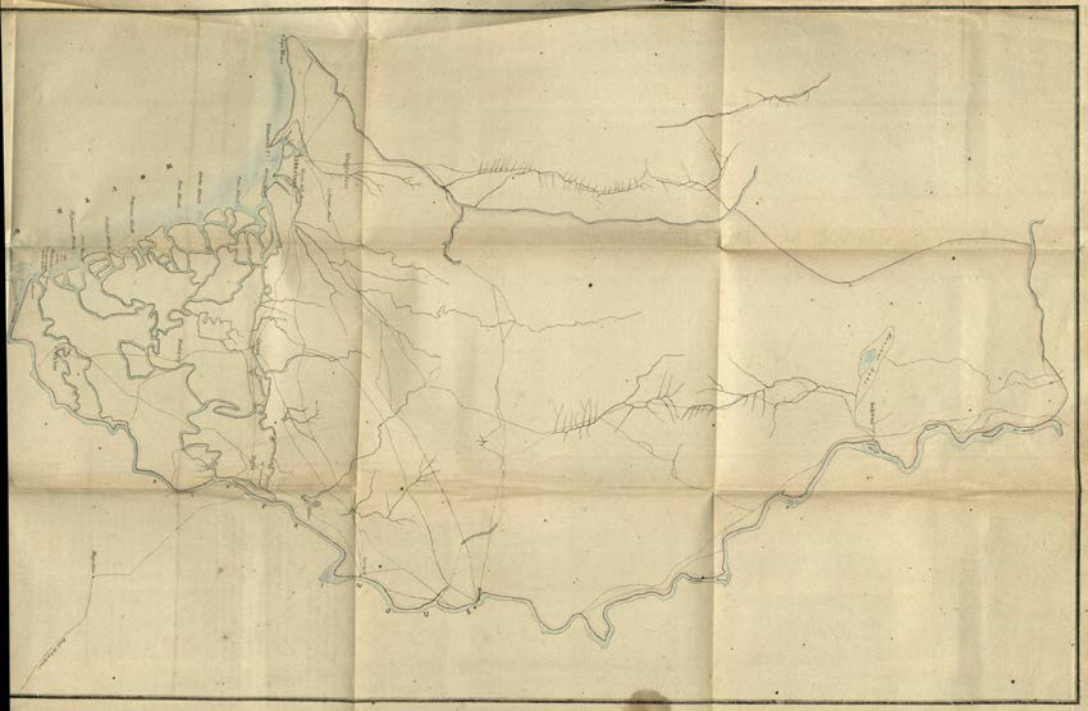
Qualifications of Assistants and Subordinates.

Executive Engineers' Reports, of the Operations of their Departments, for the year 1858-59.

Resolution.

The following are the only observations, which it appears to the

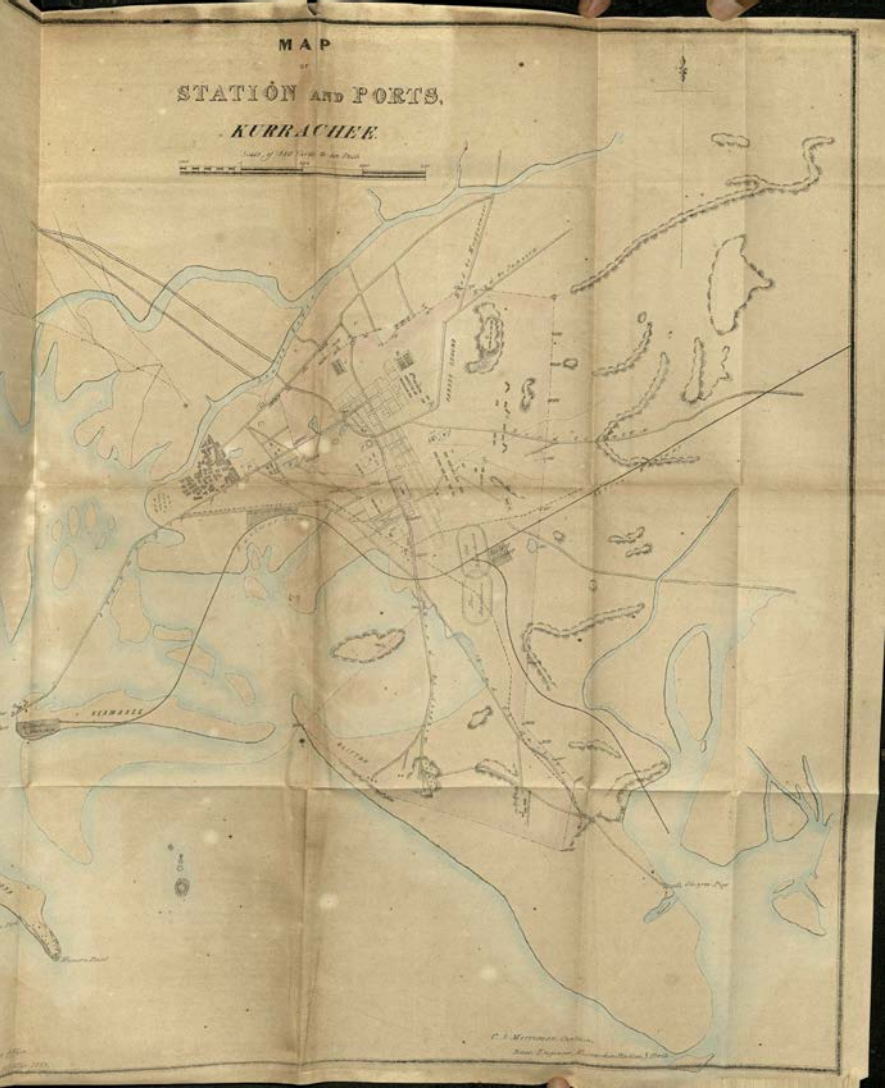

SKETCH MAP
OF
KURRACHEE COLLECTORATE.
Scale of 8 Miles to an Inch
Signed C. J. Merriman, Captain
Asst. Exp. Engr. Kurrachee District
Executive Engineer's Office
Kurrachee 1st May 1856



MAP
OF
STATION AND PORTS,
KURRACHEE.

REFERENCES.
Pinnacle on the knights
Middle Ingoing Lane
Buoys Barracks
Middle Ingoing Lane
Steamers Temporary Pontoon
New Dockyard Entrance
Arsenal
Naval Artillery Barracks
New Church
Roman Catholic Chapel
General Hospital
Government House
Collectors Cutchery
Chief Engineers Office
Telegraph Office
New Jetty
Boundary Bank
Breakwater Bank
Harbour Bank
Powder Magazine
Ex. Engineers Office
Government Garden
Kurrachee Roads
KEMARIEE
MANORA
Manora Point
Kurrachee Bunder
Kurrachee Point
Kurrachee Harbour
Kurrachee Bunder
Kurrachee Point
Manora Point
Kurrachee Bunder
Kurrachee Point
Manora Point
Kurrachee Bunder
Kurrachee Point
Manora Point

MAP
OF
STATION AND PORTS.
KURRACHEE.



Honorable the Governor in Council necessary to make upon the reports of the Chief Engineers at the Presidency and Sind, forwarding the reports of the several Executive Engineers under their control, for the year 1858-59.

Dharwar.

No. 258, dated 21st May 1859.

Paragraphs 2 to 14 of Captain Playfair's report contain his remarks on the qualifications and the manner in which his Assistant and the subordinates of his Establishment have conducted themselves during the year under report. These, and the good effect which their conduct is stated by Captain Playfair to have produced on the people, is very satisfactory to the Government, and at the same time highly creditable to his management. Captain Playfair speaks very favorably of the general usefulness of the "Maramut Maistries," and the Honorable the Governor in Council considers the plan of having such sums as the Ryuts provide or subscribe towards, and which may be expended through this class, audited by the Village Committees or Punchs, an excellent one, and worthy of general adoption, for whilst it ensures the greatest economy in the disbursement of the money spent, it tends to foster in the minds of the people an interest in works of local improvement.

Paragraph 16 of Executive Engineer's Report. Paragraph 1 of Superintending Engineer's Memorandum thereon.

2. With reference to the bridges over the Ayly and Turwar rivers, the Governor in Council would observe, that, as it is probable the restrictions upon the Public Works expenditure may not be relaxed for some years, Government will probably not be able to sanction at an early date the construction of permanent bridges across those rivers; the proposal therefore to throw over them *temporary* wooden structures at a moderate cost, seems deserving of consideration, but the necessity of this outlay even must be determined by the extent of the obstruction which these rivers offer to the traffic of the country, and respecting which information should be obtained.

3. The method by which Captain Playfair repairs the unmetalled roads appears judicious. The question as to whether bridges and drains should, when practicable, be built out of the allowance of Rs. 20 to Rs. 40 per mile, sanctioned for the repairs of such roads,

or whether they should be estimated for separately, is one on which the Chief Engineer should lay down a rule for general guidance.

4. The efficiency of the temporary bridge thrown across the Topree Nullah, whilst it reflects credit on Captain Playfair, is very satisfactory.

5. The subject of the obstruction offered by the higher castes of natives to Dhers and other low castes, can only be effectually met by permitting no encroachments upon prescriptive rights or usages on either side. If a tank has really been public in the people's sense of the term, not in ours, it should remain so. If otherwise, it ought to continue appropriated to the use of those for whom it was constructed.

Executive Engineer's Report, paragraph 19. Superintending Engineer's Memorandum, paragraph 2.

6. The project adverted to in paragraph 20 of Captain Playfair's report, is one which should meet with attention from the Superintending Engineer at his early convenience.

7. In regard to the design and nature of the barracks for the Europeans, adverted to in paragraphs 23 and 24, it may be here stated that this question will be decided upon in the Military Department; and in reference to the observations on the Fort of Dharwar, made in paragraph 4 of the Superintending Engineer's Memorandum on Captain Playfair's report, it is sufficient to remark that the Government of India have sanctioned its demolition, but that the subject is still under consideration.

8. Whether District Cutcherries should be rendered defensible, is a question the decision of which will partly rest upon the cost which it will entail upon the State, and partly on the existence of any other building of a defensible character in the station,—for instance, the jail.

9. The trouble of preparing sketch Maps, complained of by Captain Playfair in his 27th paragraph, might, the Governor in Council thinks, be greatly obviated by having maps of each officer's charge lithographed, with the towns, rivers, and finished metalled and moorum roads only shown thereon; in these the Executive Engineers could annually fill in the roads and other works executed subsequent to the date of their publication. By this plan, a uniform scale, which it is desirable for facility of comparison to observe, say of 8 or 12 miles to the inch, could be adopted.

Belgaum and Kolapoor.

10. The Honorable the Governor in Council concurs with Colonel North in thinking Captain Dickinson's report unnecessarily detailed.

11. With respect to the temporary barracks at Kuludghee and Belgaum, it will be sufficient here to state that the European Troops at Kulludghee have since been withdrawn, and the temporary barracks at Belgaum have been ordered to be pulled down and sold.

Executive Engineer's Report, Section 2, paragraphs 1 and 2. Superintending Engineer's Memorandum, paragraphs 2 and 3.

12. The suggestion of Captain Dickinson to improve the Mangilly and Corla Ghauts, by extending the sanction of Rs. 300 per mile to the foot, instead of the top of these ghauts, should be considered, as also the improvement of the 10 miles of road from the Mangilly Ghaut to Baitsee.

Paragraph 5 of Section III. Government Letter No. 943, dated 3rd April 1858.

13. The early repair of the road, referred to in paragraph 7 of Section 3 of Captain Dickinson's report, should also be attended to, with the view of preventing the money already expended upon it from being entirely thrown away.

14. When the restrictions upon expenditure are relaxed, the Governor in Council will gladly authorize the resumption of the construction of the several churches already sanctioned; but until then, other works absorb at present the limited means at the disposal of Government.

Executive Engineer's Report, paragraph 1 to 3. Superintending Engineer's Memorandum, paragraph 9.

15. The subject of Captain Dickinson's establishment, which the Chief Engineer and Lieutenant Colonel North appear to think the Honorable the Governor in Council gathers from their remarks inadequate, should be brought forward separately.

Executive Engineer's Report, paragraph 61. Superintending Engineer's Memorandum, paragraph 10.

16. Government do not quite understand the remarks of Lieutenant Colonel North relative to the Extra Establishment Fund, for it appears that to charge to works, extra remuneration to Office Clerks for working extra time, is substantially opposed to the principle laid down in the circular letter of the late

Paragraph 10 of Superintending Engineer's Report.

* * * *

It virtually sets aside the decision of Government as to the proper salaries to be allowed to the members of an Office Establishment. * * *

Superintending Engineers will, in examining the books of Executive Officers,

satisfy themselves that no disbursements to any member of the Office Establishment have been made, on any pretext whatever, beyond their regulated salaries and allowances.

Major General Waddington, of the 29th August 1856, and therefore calls for the Chief Engineer's attention.

17. With reference to the steam Saw Mill applied for by Captain Dickinson, Lieutenant Colonel North observes, an eight or ten horse-power agricultural locomotive steam-engine would be a very useful thing in an Executive Engineer's work-yard, because it could work circular-saws, pumps, lathes, &c., and if made on Boydell's Traction principle, without the defects apparent in the engine tried in Bombay, might be useful for drawing trucks of timber, stone, lime, or other material. Colonel Scott may be called upon to state whether it would be desirable to have one or more of such engines, after being rendered more effective by improvements, attached to the Public Works Department, with the view of sending them from one district to another, wherever there might be a large demand for the sawing of timber, or wherever extensive pumping operations have to be carried on in connection with irrigational or harbour projects.

Executive Engineer's Report, page 63. Superintending Engineer's Memorandum, paragraph 11.

18. The proposal to have a fixed tariff or nerrick for labour cannot, as observed by Colonel Scott, be entertained. The instances quoted by Captain Dickinson as precedents for the adoption of such a course, are by no means parallel. These observations are not, however, intended to prevent the several departments from fixing, in communication with each other, with the object of avoiding competition and interference with each others' operations, the rates of labour which they will pay, as this would be nothing more than fixing and stating (which every one is at liberty to do) the rates which those departments are willing to pay, and which, with the consent of each other, they may, from time to time, alter, as circumstances may demand.

Executive Engineer's Report, page 64. Superintending Engineer's Memorandum, paragraph 12.

Southern Concan.

19. The report of the late Mr. Armitstead opens up the important question of the suitableness of the Port of Waghotun—one deserving of separate consideration, for upon a right decision on it depends the success or otherwise of the line of

Executive Engineer's Report, paragraph 5. Superintending Engineer's Memorandum para. 2.

communication to the districts north and east of Belgaum, which has been thrown open *viâ* the Phonda Ghaut.

20. The Honorable the Governor in Council believes, that, with regard to this road, results have hitherto not been commensurate with the large sums of money which have been expended upon it. It was observed in the Resolution of Government upon the reports of the preceding year, that "the position of the Port of Vingorla, 80 miles to the north of Sedasewghur, will, of course, give it an advantage in the coasting trade with Bombay, for the steady prevalence of northerly winds during the greater part of the open season, makes even a few miles of northing valuable to vessels bound to windward." These remarks hold equally good with respect to the advantages which the Port of Waghotun holds over that of Vingorla itself, and therefore much of the trade which finds its way to the latter, ought naturally to prefer the former port; there must, therefore, be something radically wrong when trade does not avail itself of the advantages above-mentioned, and the great superiority of the harbour of Viziadroog over that of Vingorla is taken into consideration. Government believe that the interests of the existing trade would have been better consulted had the road from the Phonda Ghaut to the sea taken the northern instead of the southern bank of the Viziadroog creek, as recommended in Colonel North's report, and that the selection of Waghotun has been a mistake. The unsatisfactory state of the Phonda Ghaut itself, and the trying nature of the road between it and Kolapoor, may also account for the disfavour in which this line of road appears to be held by the trading community. But after an experiment which has endured so many years, Government ought no longer to be in doubt upon this subject. It would be advisable therefore to obtain more exact information from those of our local officers who are most competent to learn from the traders themselves the real facts of the question.

Executive Engineer's Report, paragraph 6. Superintending Engineer's Memorandum, paragraph 3. Paragraph 7 of Government Resolution on Report of 1857-58.

Sattara.

21. The remarks of the Superintending Engineer, Lieutenant Colonel North, upon Captain Kennedy's report, seem to embrace nearly all that need be said

Executive Engineer's Report, paragraphs 3

to 6. Superintending Engineer's Memorandum, paragraph 1.

upon the works which that efficient officer has had in hand. The results effected by him, which embrace the making available for wheeled traffic two lines of roads, the one to the Port of Mhar and the other to that of Chiploon, are both creditable and satisfactory. The portion of road from the foot of the Koombharli Ghaut to Chiploon on the latter of those lines, will have the early consideration of Government, as it will tend to complete a road which is already in a very advanced state.

22. With respect to the road between Sattara and Kolapoor, provision has been made for improving it in the Budget of 1860-61, so that it is to be hoped that this link of communication between the southern and central districts of the Presidency will soon be completed.

Sholapoor.

23. The completion of the road from Sholapoor to Tandoolwaree has been provided for in the Budget of 1860-61.

24. The account given by the Executive Engineer of the irrigational works in his charge, are most unsatisfactory. The desirableness of continuing to expend large sums in maintaining tanks which appear to be so unremunerative, is deserving of the immediate consideration and attention of the Superintending Engineer, and should be separately brought forward.

Executive Engineer's Report, paragraphs 6 to 11. Superintending Engineer's Report, paragraph 1.

25. The observations made by Captain Goodfellow, in paragraphs 22 to 32 of his report, relative to the site, plans, &c. of the new European Barracks to be erected at Sholapoor, will be transferred to the Military Department, in which the subject is at present under consideration.

Executive Engineer's Report, paragraphs 22 to 31. Superintending Engineer's Report, paragraph 3.

26. Government observe that Lieutenant Colonel North backs up the recommendation for granting Moonshee or Pundit allowance to European Overseers who may pass satisfactory examinations in the Native languages; the suggestion is one deserving of attention, as offering an encouragement to the acquisition of the Native languages by that class of

Executive Engineer's Report, paragraph 34. Superintending Engineer's Memorandum, paragraph 3.

officers, without a knowledge of which their efficiency in directing and superintending bodies of workmen must be greatly diminished. The Governor in Council feels so strongly on this subject, that he considers that sanction of the proposed allowance should be given as soon as possible, and that the promotion of the European subordinates in the Public Works Department should be made to depend on their obtaining a good colloquial knowledge of the vernacular of the district in which they are employed.

Poona District.

27. No important works have been carried out in these districts; the report on which therefore calls for no remarks. The completion of the bridge over the Kurra river, and of the new road from the Dewee Ghaut to Jejooree, has been provided for in the Budget of 1860-61.

Executive Engineer's Report, paragraph 29. Superintending Engineer's Letter, para. 4.

Poona and Kirkee Cantonments.

28. There is nothing in this report which calls for particular remark, with the exception of the damage done to the barracks by the carelessness of the soldiers. Extract of the Executive Engineer's report which relates to this subject will be forwarded for consideration in the Military Department, with the view of requiring that more careful enquiry be instituted by Commanding Officers, than appears to have been made in the instance quoted by Captain Boddam, previous to their signing requisitions for Petty Repairs. Government cannot expect that proper care will be taken of their property, if such certificates are signed as a mere matter of form.

Executive Engineer's Report, paragraph 12. Superintending Engineer's Letter, paragraph 5.

Northern Concan.

29. Extract, paragraph 6, of Lieutenant Melliss' report, and paragraph 4 of Lieutenant Colonel Munbee's memorandum, relative to the defilement of the water in the Rurtoonda tank, will be transferred for consideration in the Judicial Department, in order that the attention of the Magistrate may be called to the subject, in order that measures may be adopted to prevent the

Executive Engineer's Report, paragraph 6. Superintending Engineer's Letter, para. 4.

pollution noticed; with the exception of this, there is nothing which merits attention or remark in the report upon this charge.

Ahmednuggur.

30. There is nothing in the report on this Executive charge which calls for special notice.

Nassick.

31. And the same may be observed with respect to the report on this division.

Candeish.

32. In Candeish, the execution of public works has been almost entirely limited, by the restriction on the expenditure, to the construction of barracks and buildings, urgently called for by the Military Department. There are many important works of an irrigational character in this province which deserve early attention, but the Honorable the Governor in Council fears that the difficulty of obtaining labour in Candeish operates as an obstacle to progression.

BOMBAY AND AGRA ROAD.

Mhow Division.

33. Government have nothing to say in addition to what has been remarked by the Chief Engineer regarding this Executive charge.

Mhow.

34. As the frauds and mismanagement connected with the construction of the upper-storied barracks for Europeans at Indore, to which the Chief Engineer alludes in his remarks upon the report of this division, has been separately considered, it is unnecessary here to advert to it. Government are, however, glad to learn that the Chief Engineer has been able to put upon an adequate footing the establishment of the Executive Engineer of this charge, which seems to have been in an inefficient state, owing to the sudden demand made upon the Public Works Department of this Presidency, by the transfer to it of the stations of Mhow, Indore, &c. from the Government of India.

Executive Engineer's Report, paragraph 21.

35. Government observe that Captain Davidson has pointed out the inadequacy of the salaries of a 2nd Class Establishment, to enable him to procure the services of competent hands for his office, and that the Superintending Engineer supports him

Executive Engineer's Report, paragraph 33. Superintending Engineer's Letter, para. 7.

in this, observing that the price paid as wages in other offices at Mhow is so high, that "he can only recommend that this division be treated as a special case." This is a subject deserving of attention, for Government believe it to be bad economy to burden highly-paid officers with inefficient establishments, whereby the necessity of devoting much of their time to matters of detail, which good subordinates should be able to undertake, is entailed upon them, to the detriment of that general superintendence which they should exercise over all the operations under their charge.

Surat and Broach.

36. The report upon this charge is very meagre, and calls for but few observations. It is desirable that the road from Gogo to Ahmedabad, the portion of which between Gogo and Dhundooka belongs to this charge, should be prosecuted as soon as funds are available.

Executive Engineer's Report, paras. 6 and 7.

37. The success which has attended the construction of the embankment between the town and port of Dhollera is gratifying.

Executive Engineer's Report, paragraph 8. Superintending Engineer's Memo. No. 3.

38. The improvement of the Chaput Bunder has been authorized at an outlay of Rs. 8,881 from the Port Fund, so that the demand for this much called-for work has been satisfied.

Executive Engineer's Report, paragraph 9. Superintending Engineer's Memorandum, paragraph 4.

39. The construction of the Pier at Tankaria, and the improvement of the Port of Gogo, by diverting into the creek the waters of the Bhomli Nulla, are projects which are under construction, and which the Honorable the Governor considers should be undertaken at the expense of the Port Fund, if the state of that fund will permit of it.

Letter from the Chief Engineer at the Presidency, No. 7510, dated 15th November 1859.
Resolution of Government, dated 24th December 1859, Revenue Department.

Ahmedabad and Kaira, including Baroda, Deesa, and Mount Aboo.

40. The operations described in the reports of these two charges do not call for any comment.

41. Extract (paragraph 14) of Lieutenant Maunsell's report should be transferred to the Financial Department, with the view of having a supply of copper coin sent to Mount Aboo, if possible. The deficiency in the copper currency is severely

Executive Engineer's Report, paragraph 14. Superintending Engineer's Memorandum, paragraph 9.

felt every where, and the general rate at which it can be procured appears to be only 15 annas for the rupee, or $6\frac{1}{4}$ per cent. discount. The hardship of such a rate on the lower classes, whose dealings are almost entirely conducted in fractions of a rupee, is so self-evident, that it does not need comment. It is satisfactory, however, to reflect, that this state of things will be speedily relieved by the large consignments of copper which are now on their way out from England.

Canal Department, Sind.

42. The report of the Superintendent of Canals describes succinctly the operations of the department generally during the period under review. The testimony which Captain Fife bears to the activity on the part of all under his orders, and the cordial co-operation which they afforded him in carrying out the various works and surveys which have been in progress, is most creditable to all concerned, and gratifying to Government.

43. The operations of the Department have been more fully described and explained in the reports of Captain Fife's several Assistants, and in his special reports transmitting each, which Government now proceeds to consider.

Captain Soady's Report.

44. Although Captain Soady's report calls for no special observations in regard to the projects on which he has been mainly employed (the survey of the Desert Canal, proposed by the late General John Jacob), it testifies amply to the energy displayed by him in the quantity of work he has performed during the season, and which reflects the greatest credit both on himself and on his establishment.

Mr. Price and Lieutenant LeMesurier's Reports.

45. In reference to the reports of these two officers, the works in connection with the Narra Supply Channel deserves special notice. The early and *successful* completion of these works by the Superintendent of Canals, is stated to be chiefly due to the exertions of these officers, and Government concur with Captain Fife in considering them entitled to great credit.

Mr. Jones' Report.

46. This officer has exhibited considerable energy during the season under report, in completing the Hydrabad Cutting, or new

Supply Channel to the Fullalie, and in the improvements of that river itself below Hydrabad. Government will be glad to learn that the large increase of revenue which Captain Fife and Mr. Jones anticipate from these works has been realized. On this point, a separate report should be submitted, the absence of any definite information regarding which is owing, the Honorable the Governor in Council observes, to the failure of the Collector to reply to the reference made to him by the Executive Engineer on the subject.

Mr. Barnes' Report.

47. The progress made with the Mitrow Canal, during the very short period which intervened between its commencement and the close of the working season, is creditable to Mr. Barnes, and the results produced by the excavation of the small Channel is highly satisfactory.

48. The fact mentioned by Captain Fife, at the close of paragraph 3 of his transmitting letter, is an interesting one, and reflects favorably on the foresight and judgment of the Zemindar in question.

49. The proposal made at the close of Mr. Barnes' report, relative to the training of the subordinates of the department, has been met by the arrangements which have been sanctioned, permitting the Canal Officers to send a certain number of their Surveyors, during the recess, to the Engineering School at Kurrachee for instruction.

Government Resolution No. 2187, dated 20th August 1859.

Lieutenant Penny's Report.

50. The operations on which Lieutenant Penny has been employed during the season under report, do not call for any special observations.

Lower Sind, as also the Station and Port of Kurrachee.

51. Captain Merriman has been in temporary charge of the districts of Lower Sind, in addition to his own special duties, during the absence of Captain Davidson on leave—an arrangement which, looking to the present distribution of the Public Works Department, it seems impracticable to avoid.

52. The practice noticed by Captain Merriman, in the 51st paragraph of his report, and by the Acting Chief Engineer in the 16th paragraph of his transmitting letter, will, it is to be hoped, be done

away with when the system of a general and regular relief for Sind, as proposed by the Chief Engineer at the Presidency, is carried out.

Central Sind.

53. Captain Thompson's remarks on the inefficiency of his establishment, consequent on their inexperience, also points to the necessity of regular reliefs among the subordinates; and Government concur with Lieutenant Colonel Hart in thinking that, in arranging these reliefs, some of the elder subordinates from the Presidency division, who have never yet been employed in Sind, should be required to take their turn of duty in that province.

54. The services of additional officers having been transferred for employment in the Public Works Department in Sind since the date of Captain Thompson's report, it is therefore unnecessary to remark upon his observations relative to an increase to the number of the permanent subordinates of the establishment of his charge.

55. The difficulties which the Department labour under in procuring labour, and which Captain Thompson has adverted to at considerable length, having already been considered in paragraph 19 of this Resolution. It therefore appears unnecessary to again enter upon the subject in reference to this report.

56. In conclusion, Government observe with satisfaction, that Lieutenant Colonel Hart has favorably noticed the exertions, during the year under report, of the Executive Officers more immediately under his orders.

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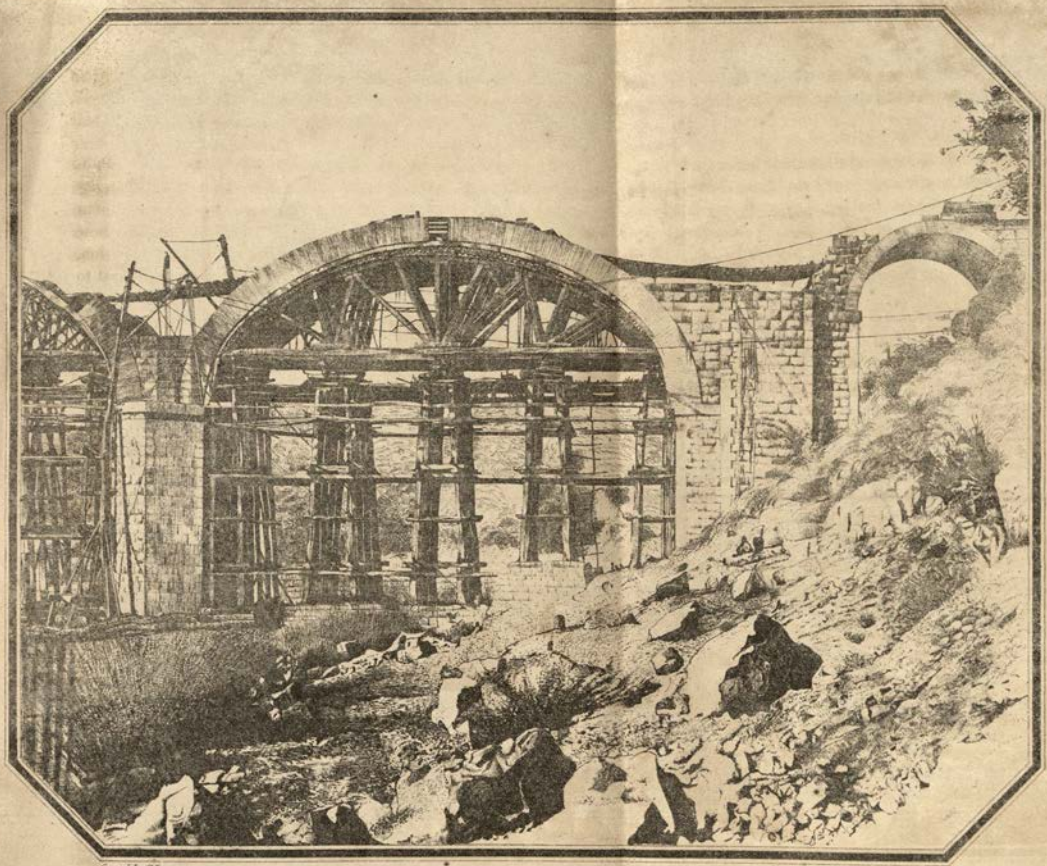

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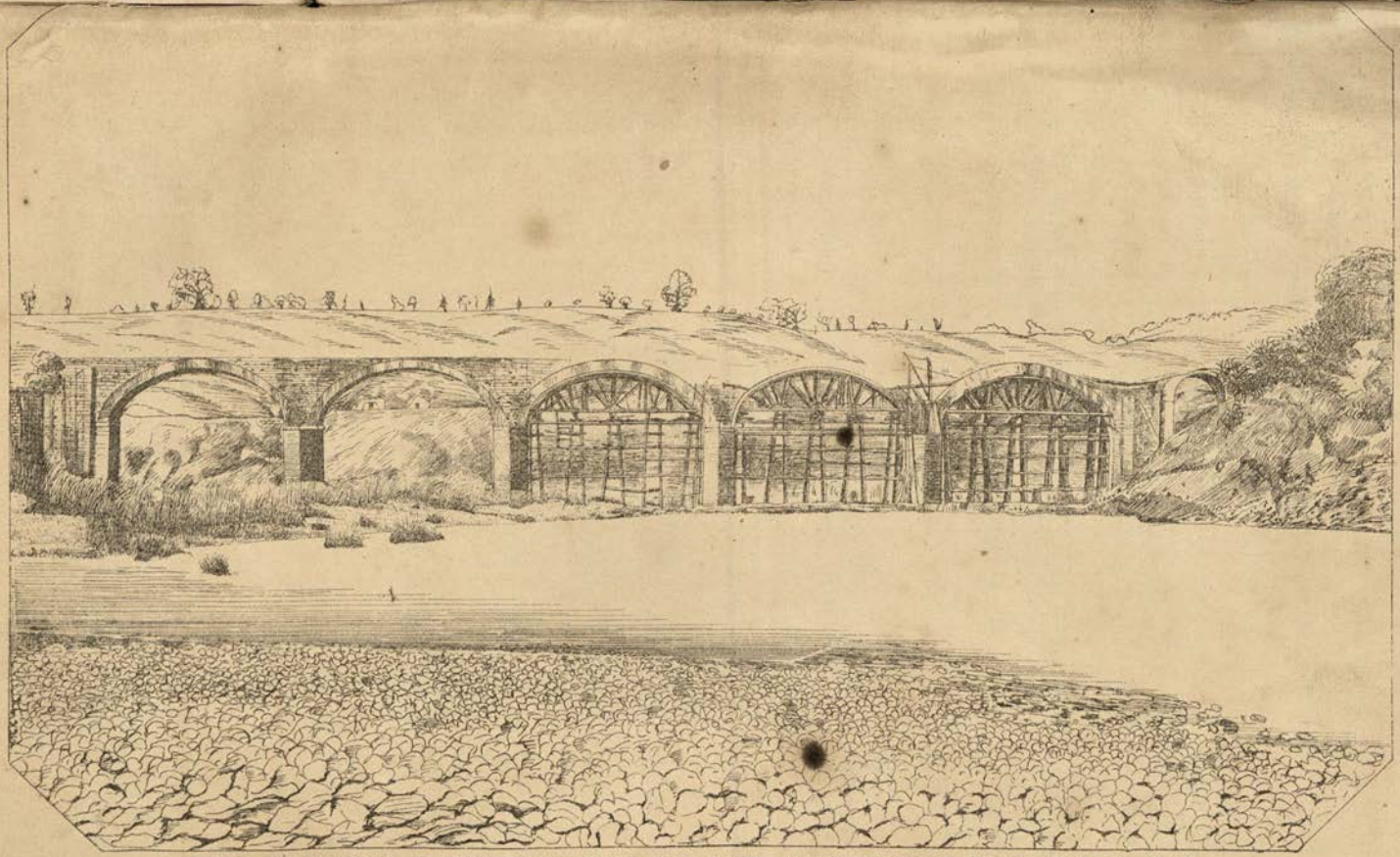
CENTRE OF Nº 5 ARCH TWO DAYS BEFORE KEYING.

Showing west abutment and land arch part of Nº 4 Arch and Nº 4 Pier with derricks for hoisting up Materials.



STATE OF PROGRESS OF THE BRIDGE OVER THE KOINA AT HELWANK, ON THE 25TH APRIL 1859.

Bridge consists of 5 spans of 60' each and two 20' semicircular land arches. Form of main arches semi-ellipses of 20' rise. Thickness of arch 3' Height of Roadway above bed of stream 52 feet. Foundations through sand and water to Rock.

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